Vol. 1108 Number 1

OFFICIAL GAZETTE

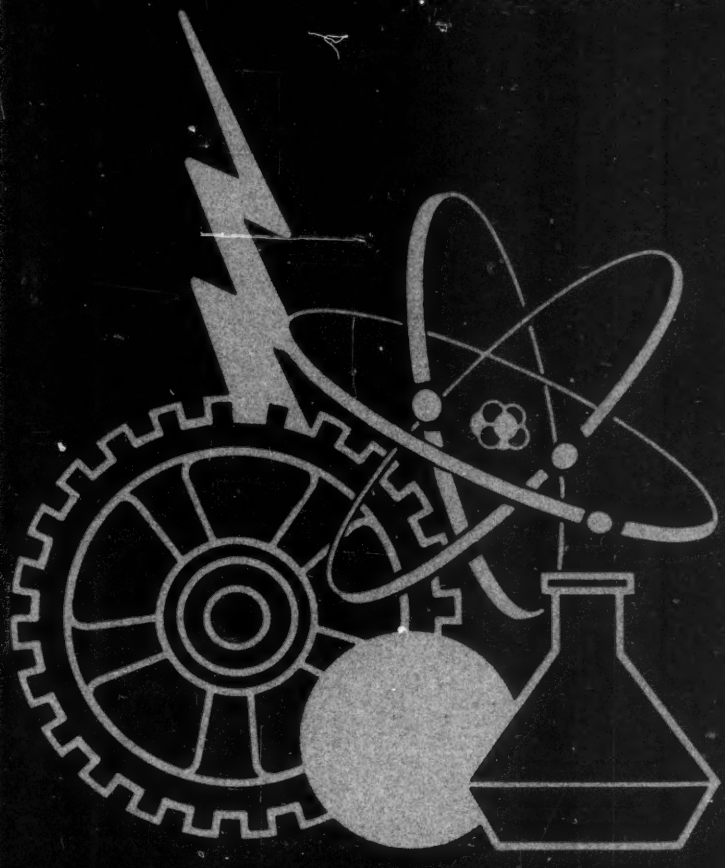
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

NOVEMBER 7, 1989



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OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

November 7, 1989 Volume 1108 Number 1

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1107 O.G. 5 on Oct. 3, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 5 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of Sept. 1, 1989, and was announced in the *Official Gazette* at 1105 O.G. 36 on Aug. 15, 1989.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1040.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	436.00
Basic Supplemental fee (for each page over 30)	9.00
Designation fee per country or region for the first 10 national or regional offices	106.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	134.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	30.00	30.00

Sept. 12, 1989. DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on November 4, 1986, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,620,322 through 4,621,376
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on November 2, 1982 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,356,569 through 4,357,713
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

" (e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or

after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00"

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant..... $495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED AUGUST 20, 1989
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,535,479	06/665,613	08/20/85
4,535,491	06/602,528	08/20/85
4,535,495	06/517,076	08/20/85
4,535,499	06/583,010	08/20/85
4,535,505	06/607,965	08/20/85
4,535,506	06/548,168	08/20/85
4,535,510	06/539,277	08/20/85
4,535,522	06/575,760	08/20/85
4,535,539	06/589,159	08/20/85
4,535,540	06/475,119	08/20/85
4,535,546	06/583,679	08/20/85
4,535,551	06/589,635	08/20/85
4,535,556	06/582,461	08/20/85
4,535,565	06/498,387	08/20/85
4,535,566	06/493,331	08/20/85
4,535,571	06/580,242	08/20/85
4,535,572	06/580,601	08/20/85
4,535,574	06/436,311	08/20/85
4,535,575	06/446,412	08/20/85
4,535,582	06/441,132	08/20/85
4,535,596	06/595,200	08/20/85
4,535,609	06/589,248	08/20/85
4,535,613	06/409,627	08/20/85
4,535,623	06/608,995	08/20/85
4,535,624	06/499,820	08/20/85
4,535,626	06/587,379	08/20/85
4,535,630	06/458,742	08/20/85
4,535,634	06/614,055	08/20/85
4,535,647	06/488,367	08/20/85
4,535,648	06/510,546	08/20/85
4,535,655	06/557,041	08/20/85
4,535,661	06/559,415	08/20/85
4,535,663	06/500,610	08/20/85
4,535,676	06/433,272	08/20/85
4,535,683	06/536,214	08/20/85
4,535,684	06/643,052	08/20/85
4,535,685	06/586,061	08/20/85
4,535,686	06/588,746	08/20/85
4,535,690	06/475,623	08/20/85
4,535,706	06/592,725	08/20/85
4,535,708	06/606,848	08/20/85
4,535,710	06/679,341	08/20/85
4,535,712	06/453,888	08/20/85
4,535,713	06/590,531	08/20/85
4,535,721	06/590,167	08/20/85
4,535,726	06/609,325	08/20/85
4,535,728	06/576,428	08/20/85
4,535,729	06/658,253	08/20/85
4,535,735	06/376,132	08/20/85
4,535,750	06/531,481	08/20/85
4,535,751	06/610,122	08/20/85
4,535,752	06/417,708	08/20/85
4,535,753	06/599,516	08/20/85
4,535,778	06/494,534	08/20/85
4,535,781	06/487,785	08/20/85
4,535,783	06/518,859	08/20/85
4,535,784	06/676,220	08/20/85
4,535,785	06/421,992	08/20/85
4,535,786	06/516,627	08/20/85
4,535,795	06/602,836	08/20/85
4,535,796	06/608,051	08/20/85
4,535,800	06/594,038	08/20/85
4,535,804	06/537,410	08/20/85
4,535,806	06/558,450	08/20/85
4,535,812	06/397,653	08/20/85
4,535,814	06/522,026	08/20/85
4,535,817	06/591,554	08/20/85
4,535,823	06/521,105	08/20/85
4,535,829	06/561,187	08/20/85
4,535,845	06/528,672	08/20/85
4,535,851	06/473,645	08/20/85
4,535,853	06/564,804	08/20/85
4,535,854	06/442,026	08/20/85
4,535,858	06/593,935	08/20/85
4,535,861	06/489,376	08/20/85
4,535,863	06/526,705	08/20/85
4,535,875	06/471,711	08/20/85
4,535,878	06/653,087	08/20/85
4,535,885	06/493,752	08/20/85
4,535,890	06/487,104	08/20/85
4,535,894	06/460,248	08/20/85
4,535,902	06/423,358	08/20/85

Patent Number	Serial Number	Issue Date
4,535,903	06/604,663	08/20/85
4,535,913	06/592,451	08/20/85
4,535,918	06/500,765	08/20/85
4,535,920	06/537,842	08/20/85
4,535,922	06/597,406	08/20/85
4,535,923	06/478,678	08/20/85
4,535,930	06/570,881	08/20/85
4,535,931	06/531,998	08/20/85
4,535,937	06/486,731	08/20/85
4,535,938	06/423,867	08/20/85
4,535,948	06/419,169	08/20/85
4,535,957	06/514,737	08/20/85
4,535,962	06/509,966	08/20/85
4,535,965	06/597,932	08/20/85
4,535,971	06/559,017	08/20/85
4,535,974	06/599,140	08/20/85
4,535,979	06/569,305	08/20/85
4,535,988	06/412,524	08/20/85
4,535,991	06/548,951	08/20/85
4,535,995	06/533,242	08/20/85
4,536,001	06/460,166	08/20/85
4,536,008	06/576,791	08/20/85
4,536,009	06/497,706	08/20/85
4,536,014	06/414,535	08/20/85
4,536,017	06/489,862	08/20/85
4,536,021	06/393,327	08/20/85
4,536,023	06/519,126	08/20/85
4,536,033	06/519,003	08/20/85
4,536,034	06/484,766	08/20/85
4,536,038	06/614,445	08/20/85
4,536,039	06/564,665	08/20/85
4,536,040	06/285,076	08/20/85
4,536,043	06/513,606	08/20/85
4,536,045	06/457,315	08/20/85
4,536,047	06/406,361	08/20/85
4,536,083	06/581,577	08/20/85
4,536,087	06/502,370	08/20/85
4,536,100	06/480,139	08/20/85
4,536,102	06/476,754	08/20/85
4,536,104	06/579,515	08/20/85
4,536,105	06/579,462	08/20/85
4,536,106	06/546,289	08/20/85
4,536,109	06/587,190	08/20/85
4,536,120	06/459,632	08/20/85
4,536,123	06/520,411	08/20/85
4,536,127	06/605,773	08/20/85
4,536,132	06/498,133	08/20/85
4,536,136	06/477,610	08/20/85
4,536,138	06/687,232	08/20/85
4,536,144	06/533,456	08/20/85
4,536,147	06/626,239	08/20/85
4,536,155	06/611,011	08/20/85
4,536,167	06/560,893	08/20/85
4,536,191	06/626,831	08/20/85
4,536,197	06/532,835	08/20/85
4,536,199	06/568,462	08/20/85
4,536,200	06/538,758	08/20/85
4,536,214	06/511,464	08/20/85
4,536,228	06/467,130	08/20/85
4,536,238	06/584,592	08/20/85
4,536,252	06/699,283	08/20/85
4,536,258	06/611,878	08/20/85
4,536,261	06/638,435	08/20/85
4,536,286	06/559,964	08/20/85
4,536,288	06/628,325	08/20/85
4,536,289	06/542,607	08/20/85
4,536,290	06/579,984	08/20/85
4,536,296	06/474,719	08/20/85
4,536,297	06/572,103	08/20/85
4,536,299	06/671,192	08/20/85
4,536,307	06/535,139	08/20/85
4,536,308	06/656,286	08/20/85
4,536,325	06/573,521	08/20/85
4,536,330	06/589,510	08/20/85
4,536,331	06/545,989	08/20/85
4,536,336	06/565,216	08/20/85
4,536,339	06/414,509	08/20/85
4,536,356	06/560,980	08/20/85
4,536,359	06/540,976	08/20/85
4,536,367	06/559,999	08/20/85
4,536,368	06/560,000	08/20/85
4,536,378	06/541,512	08/20/85
4,536,388	06/514,738	08/20/85
4,536,403	06/617,774	08/20/85
4,536,433	06/532,796	08/20/85
4,536,438	06/588,107	08/20/85
4,536,456	06/509,023	08/20/85
4,536,497	06/520,883	08/20/85
4,536,499	06/481,373	08/20/85
4,536,503	06/569,011	08/20/85
4,536,504	06/513,339	08/20/85
4,536,509	06/585,621	08/20/85
4,536,511	06/577,447	08/20/85
4,536,523	06/565,212	08/20/85
4,536,525	06/629,574	08/20/85
4,536,534	06/566,522	08/20/85
4,536,548	06/491,698	08/20/85
4,536,551	06/626,829	08/20/85
4,536,566	06/260,502	08/20/85
4,536,567	06/631,948	08/20/85
4,536,569	06/247,869	08/20/85
4,536,570	06/436,509	08/20/85
4,536,586	06/619,419	08/20/85
4,536,602	06/616,359	08/20/85
4,536,609	06/511,143	08/20/85
4,536,619	06/565,629	08/20/85
4,536,638	06/429,845	08/20/85
4,536,646	06/505,087	08/20/85
4,536,657	06/558,950	08/20/85
4,536,665	06/453,032	08/20/85
4,536,671	06/487,964	08/20/85
4,536,681	08/515,297	08/20/85
4,536,688	06/694,918	08/20/85
4,536,705	06/593,940	08/20/85
4,536,719	06/346,047	08/20/85
4,536,728	06/538,236	08/20/85
4,536,732	06/612,156	08/20/85
4,536,752	06/454,444	08/20/85
4,536,756	06/558,048	08/20/85
4,536,762	06/378,536	08/20/85
4,536,763	06/319,705	08/20/85
4,536,785	06/526,912	08/20/85
4,536,789	06/521,364	08/20/85
4,536,799	06/427,899	08/20/85
4,536,800	06/445,513	08/20/85
4,536,811	06/365,564	08/20/85
4,536,821	06/584,343	08/20/85
4,536,822	06/706,911	08/20/85
4,536,825	06/594,745	08/20/85
4,536,838	06/478,604	08/20/85
4,536,840	06/432,135	08/20/85
4,536,841	06/464,841	08/20/85
4,536,865	06/557,396	08/20/85
4,536,866	06/455,307	08/20/85

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S. C. 41(c)(1) and 37 CFR 1.378.

Patent No	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,466,968	06/310,103	08/21/84	10/09/81	10/05/89
4,472,067	06/410,398	09/18/84	08/23/82	10/11/89
4,497,155	06/377,567	02/05/85	05/12/82	10/11/89

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

4,699,323, Re. S. N. 416,569, Filed Oct. 3, 1989, Cl. 239/585, DUAL SPRAY CONE ELECTROMAGNETIC FUEL INJECTION, James H. Rush, et al., Owner of Record: *General Motors Corp., Detroit, Mich.*, Attorney or Agent: C. K. Veenstra, Ex. Gp.: 314

4,034,083, Re. S. N. 413,873, Filed Sept. 29, 1989, Cl. 514/53, COMPOSITIONS FOR INHIBITING ABSORPTION OF CHOLESTEROL, Fred H. Mattson, Owner of Record: *Inventor,* Attorney or Agent: Eric Guttag, Ex. Gp.: 183

4,535,732, Re. S. N. 315,195, Filed Feb. 27, 1989, Cl. 123, VALVE OPERATION CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINES, Yoshikatsu Nakano, et al., Owner of Record: *Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan,* Attorney or Agent: John F. Carney, Ex. Gp.: 342

4,679,964, Re. S. N. 378,996, Filed July 12, 1989, Cl. 405/216, OFFSHORE WELL SUPPORT MINIPLATFORM, Joseph W. Blandford, Owner of Record: *Seahorse Equipment Corp.*, Attorney or Agent: Donald Gunn, Ex. Gp.: 351

4,701,124, Re. S. N. 415,997, Filed Oct. 2, 1989, Cl. 431/284, COMBUSTION CHAMBER APPARATUS FOR COMBUSTION INSTALLATION, ESPECIALLY FOR COMBUSTION CHAMBERS OF GAS TURBINE INSTALLATION, AND A METHOD OF OPERATING THE SAME, Helmut Maghon, et al., Owner of Record: *Kraftwerk Union Aktiengesellschaft, Mulheim/Ruhr, Germany,* Attorney or Agent: Herbert L. Lerner, Ex. Gp.: 341

4,746,153, Re. S. N. 413,579, Filed Sept. 28, 1989, Cl. 292/216, CLOSURE PANEL PULL DOWN MECHANISM, David E. Compeau, et al., Owner of Record: *General Motors Corp., Detroit, Mich.*, Attorney or Agent: Charles E. Leahy, Ex. Gp.:358

4,785,996, Re. S. N. 345,467, Filed Apr. 28, 1989, Cl. 239/298, ADHESIVE SPRAY GUN AND NOZZLE ATTACHMENT, Roger A. Ziecker, et al., Onwer of Record: *Nordson Corp., Amherst, Ohio,* Attorney or Agent: Thomas L. Kautz, Ex. Gp.: 314

4,788,418, Re. S. N. 412,922, Filed Sept. 26, 1989, Cl. 235/379, AUTOMATIC TRANSACTION MACHINE, Setsuo Tsukui, Owner of Record: *Fujitsu Ltd., Kawasaki, Japan,* Attorney or Agent: John P. Moran, Ex. Gp: 213

4,816,154, Re. S. N. 362,951, Filed June 5, 1989, Cl. 210/448, LIQUID FILTERING APPARATUS, Philip J. Hartley, Owner of Record: *Inventor,* Attorney or Agent: William S. Frommer, Ex. Gp.: 136

4,849,521, Re. S. N. 413,427, Filed Sept. 27, 1989, Cl. 546/209, STEREOSELECTIVE PERPARATION OF 3-SUBSTITUTED-4 PIPERIDINE COMPOUND AND DERIVATIVES, Linas V. Kudzma, Owner of Record: *Boc Inc., Montvale, N.J.*, Attorney or Agent: R. Hain Swope, Ex. Gp.: 129

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

3,826,728, Reexam. No. 90/001,858, Requested October 5, 1989, Cl. 204/192, TRANSPARENT ARTICLES HAVING REDUCED SOLAR RADIATION TRANSMITTANCE AND METHOD OF MAKING SAME, Douglas L. Chambers, et al., Owner of Record: *The Boc GRP PLC, Inc. Windlesham, England,* Attorney or Agent: David Draegert, Ex. Gp.: 110, Requester: PPG Industries, Pittsburg, Pa.

4,647,612, Reexam. No. 90/001,854, Requested October 2, 1989, Cl. 524/458, POLYMER EMULSION PRODUCTS, AJay I. Ranka, et al., Owner of Record: *PPG Industries, Inc., Pittsburg, Pa.*, Attorney or Agent: William Uhl, Ex. Gp.: 150, Requester: Owner

4,692,491, Reexam. No. 90/001,855, Requested October 2, 1989, Cl. 524/458, POLYMER EMULSION PRODUCTS, AJay I. Ranka, et al., Owner of Record: *PPG Industries, Inc., Pittsburg, Pa.*, Attorney or Agent: William Uhl, Ex. Gp.: 150, Requester: Owner

4,692,599, Reexam. No. 90/001,856, Requested October 2, 1989, Cl. 219/532, COIL SUPPORT FOR ELECTRIC HEATER, H. Keith Howard, et al., Owner of Record: *Adams Industries, Cookville, Tenn.*, Attorney or Agent: Berman, Aisenberg & Platt, Ex. Gp.: 210, Requester: Emerson Electric Co., St. Louis, Mo.

4,802,732, Reexam. No. 90/001,857, Requested October 5, 1989, Cl. 350/96.230, OPTICAL FIBER CABLE PREVENTING WATER FROM SPREADING TOWARD CABLE INTERIOR, Masumi Fukuma, et al, Owner of Record: *Sumitomo Electric Ind. Osaka, Japan,* Attorney or Agent: J. F. Osha, Ex. Gp.: 250, Requester: Owner

Suspension

Ralph M. Martin of Boulder, Co., formerly of Fort Lauderdale, Fla., whose registration number is 32,267, has been suspended for a period extending until he is reinstated to practice law by the Florida Bar and by the Director of the Office of Enrollment and Discipline. This action is taken under the provisions of 35 USC 32, and 37 CFR 10.130 and 10.133(g).

October 11, 1989 CAMERON WEIFFEBACH, *Director*
Office of Enrollment and Discipline

PATENT NOTICES

Certificates of Correction For Week of November 7, 1989

D. 298,250	4,782,545	4,806,948	4,816,148
D. 300,613	4,784,507	4,807,317	4,816,417
D. 300,770	4,786,749	4,808,145	4,816,427
4,344,530	4,789,773	4,808,315	4,816,649
4,521,506	4,790,564	4,808,364	4,816,727
4,631,735	4,791,438	4,808,425	4,816,734
4,666,493	4,792,330	4,808,958	4,817,014
4,680,027	4,792,519	4,809,708	4,817,154
4,690,662	4,793,561	4,809,794	4,817,200
4,701,402	4,794,205	4,810,408	4,817,291
4,708,925	4,794,551	4,810,691	4,817,723
4,722,996	4,794,645	4,810,910	4,817,979
4,727,237	4,795,533	4,810,957	4,818,182
4,728,258	4,795,948	4,810,963	4,818,302
4,739,350	4,796,191	4,810,965	4,818,503
4,745,844	4,796,856	4,811,396	4,818,833
4,754,052	4,797,299	4,811,414	4,819,396
4,755,547	4,798,044	4,811,476	4,819,824
4,759,908	4,798,076	4,811,799	4,819,894
4,760,400	4,798,515	4,812,060	4,820,576
4,763,160	4,799,100	4,812,079	4,820,850
4,766,139	4,799,607	4,812,103	4,821,090
4,768,154	4,800,541	4,812,910	4,821,523
4,768,664	4,800,816	4,813,655	4,821,589
4,769,320	4,801,243	4,813,697	4,821,813
4,770,802	4,801,420	4,814,064	4,823,159
4,773,094	4,801,671	4,814,089	4,823,479
4,773,873	4,802,895	4,814,382	4,823,826
4,773,921	4,803,093	4,814,440	4,823,959
4,774,231	4,803,261	4,814,689	4,828,058
4,774,321	4,803,727	4,814,692	4,831,826
4,777,650	4,803,832	4,814,716	4,833,313
4,780,190	4,803,980	4,814,972	4,833,920
4,780,400	4,804,264	4,815,429	4,839,531
4,782,137	4,805,904	4,815,809	4,841,809

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

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PATENT APPLICATION	New patent application and associated papers and fees.
TRADEMARK APPLICATION	New trademark application and associated papers and fees.
Box Assignments	All assignment documents except those filed in new patent applications.

Reference Collection of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

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	Sunnyvale Patent Clearinghouse	(408) 730-7290
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	Toledo/Lucas County Public Library	(419) 259-5212
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Oregon	Salem: Oregon State University	(503) 378-4239
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	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF October 7, 1989

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action

CHEMICAL EXAMINING GROUPS

GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director 5-26-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director 6-16-87
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director 4-15-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director 5-14-87
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director 9-10-86

ELECTRICAL EXAMINING GROUPS

INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director 9-24-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director 2-27-87
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director 5-28-87
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director 5-27-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director 8-18-87
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260 S. LEVY, Acting Director 8-17-87
DESIGN, GROUP 290—K. L. CAGE, Director 2-6-86

MECHANICAL EXAMINING GROUPS

HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director 5-18-88
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director 4-13-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director 4-20-87
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director 2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director 1-3-89

Expiration of patents: The patents within the range of numbers indicated below expire during October 1989, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,694,814 to 3,702,011 inclusive
Plant Patents ..... None

STATUTORY INVENTION REGISTRATIONS

PUBLISHED NOVEMBER 7, 1989

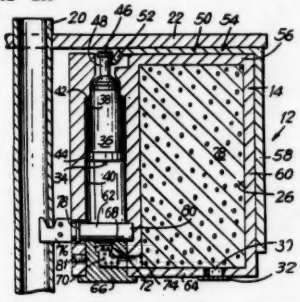
A statutory invention registration is not a patent. It has the defensive attributes of a patent but does not have the enforceable attributes of a patent. No article or advertisement or the like may use the term patent, or any term suggestive of a patent, when referring to a statutory invention registration. For more specific information on the rights associated with a statutory invention registration see 35 U.S.C. 157.

H697

SUBMUNITION FUSE WITH REMOVABLE BLOCKER

Terry E. Thomas, Sr., Forest Hill, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 10, 1989, Ser. No. 379,023
Int. Cl.[4] F42C *15/22*; F41B *13/50*
U.S. Cl. 102—239 **11 Claims**



1. A fuze for a submunition subjected to spinning and air turbulence after ejection from a launched projectile containing the submunition, comprising:

(a) a submunition housing having a compartment containing a solid pyrotechnic chemical main charge which, when burned, produces an incapacitating gas;

(b) a percussion-type firing pin mounted on the housing for movement in a longitudinal direction along a travel path from a latched to a released position;

(c) biasing means for constantly urging the firing pin along the travel path from the latched to the released position;

(d) latch means for engaging and maintaining the firing pin in the latched position;

(e) a casing stationarily mounted on the housing and having a chamber containing a percussion primer, said chamber having an access port aligned with, and in the travel path of, the firing pin, and an exit port in open communication with the compartment containing the main charge;

(f) a displaceable blocking means mounted on the housing for displacement in a transverse direction generally perpendicular to the longitudinal direction between blocked and unblocked positions in which the blocking means is respectively in and remote from the travel path of the firing pin;

(g) displacing means for displacing the blocking means from the blocked to the unblocked position when centrifugal forces generated during said spinning and said air turbulence cooperate to pull the blocking means to the unblocked position;

(h) said latch means being further operative for releasing the firing pin when subjected to said spinning and air turbulence to enable the biasing means to urge the released pin past the blocking means in the unblocked position through the access port and into striking contact with the primer, thereby detonating the primer and directing a flame through the exit port to burn the main charge in the compartment; and

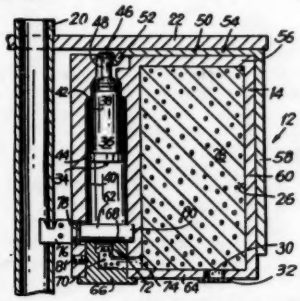
(i) a discharge port on the housing and through which the incapacitating gas is discharged, for saturating an area with the incapacitating gas at far range from the projectile launch site.

H698

SUBMUNITION FUSE

Terry E. Thomas, Sr., Forest Hill, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 10, 1989, Ser. No. 379,024
Int. Cl.[4] F42C *15/22*; F42B *13/50*
U.S. Cl. 102—245 **11 Claims**



1. A fuze for a submunition subjected to spinning and air turbulence after launch of a projectile containing the submunition, comprising:

(a) a submunition housing having a compartment containing a solid pyrotechnic chemical main charge which, when burned, produces an incapacitating gas;

(b) a percussion-type firing pin mounted in the housing for movement in a longitudinal direction along an axis from a latched to a released position;

(c) biasing means for constantly urging the firing pin along the longitudinal direction from the latched to the released position;

(d) latch means for engaging and maintaining the firing pin in the latched position;

(e) a slider having a chamber containing a percussion primer, said chamber having an access port through which the primer is accessible and an exit port in open communication with the compartment containing the main charge, said slider being mounted on the housing for displacement in a transverse direction generally perpendicular to the longitudinal direction between offset and aligned positions in which the access port is respectively offset from and aligned with the axis;

(f) displacing means for constantly displacing the slider along the transverse direction to the offset position against centrifugal forces generated during said spinning until such centrifugal forces reach a predetermined threshold sufficient to displace the slider to the aligned position;

(g) locking means for locking the slider in the aligned position;

(h) said latch means being further operative for releasing the firing pin when subjected to said spinning and air turbulence to enable the biasing means to urge the released pin through the access port and into striking contact with the primer in the aligned position of the locked slider, thereby detonating the primer and directing a flame through the exit port to burn the main charge in the compartment; and

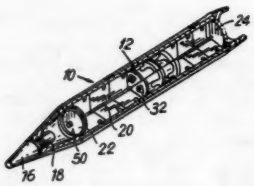
(i) a discharge port on the housing and through which the incapacitating gas is discharged, for saturating an area with the incapacitating gas at far range from the projectile launch site.

H699

SUBMUNITION FUSE WITH PYROTECHNIC IGNITION

Terry E. Thomas, Sr., Forest Hill, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 10, 1989, Ser. No. 379,040
Int. Cl.[4] F42B *13/46*
U.S. Cl. 102—370 9 Claims



1. A fuze for a submunition ejected from a launched projectile upon detonation of an on-board expelling charge, comprising:

(a) a hollow core rod centrally mounted within, and extending along a longitudinal axis of, the projectile, said core rod having an interior longitudinal channel, and at least one flash port extending radially outwardly of the longitudinal axis and communicating with the longitudinal channel;

(b) at least one submunition housing mounted within the projectile radially adjacent the core rod, said housing having a compartment containing a solid pyrotechnic chemical main charge which, when burned, produces an incapacitating gas, said housing having at least one access port aligned with a respective flash port and communicating with the main charge in the compartment;

(c) pyrotechnic fuzing means loaded within the longitudinal channel and a respective access port, and operative for burning upon detonation of the expelling charge, thereby directing a flame through the longitudinal channel, the respective flash port and the respective access port to burn the main charge in the compartment; and

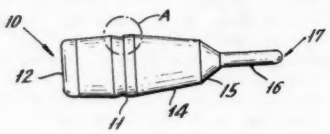
(d) a discharge port on the housing and through which the incapacitating gas is discharged, for saturating an area with the incapacitating gas.

H700

PROBE NOSE TRAINING CARTRIDGE

Anthony L. Farinacci, 13101 Sanfield Rd., Baldwin, Md. 21013

Filed Jul. 7, 1989, Ser. No. 379,320
Int. Cl.[4] F42B *8/00*
U.S. Cl. 102—529 14 Claims



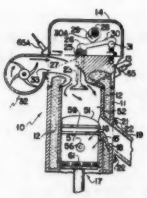
1. A bullet for a training cartridge; said bullet having a generally cylindrical body section, one end of which is receivable into a cartridge case; said cylindrical body section having a first diameter at a given axial position and having an elongated probe section extending from the opposite end of said cylindrical body section; said elongated probe section being coaxial with said cylindrical body section; said elongated probe section having a lateral width which is less than said first diameter and a length which is at least about 25% of the total length of said bullet.

H701

TWO CYCLE INTERNAL COMBUSTION ENGINE

Antonio D. Ancheta, 446 Toronto Street, Winnipeg, Manitoba, Canada (R3G 1S5)

Filed Dec. 12, 1988, Ser. No. 282,638
Int. Cl.[4] F02B *25/04*
U.S. Cl. 123—65 VB 20 Claims



1. In a two-stroke supercharged multi-cylinder internal combustion engine, with inline or V-type configuration and including a recirculating type constant pressure lubrication system; comprising in combination a cylinder block having cylinder bores formed therein, a cylinder head on the upper end of the cylindrical bores and closing same and defining a combustion chamber at the upper end of each cylindrical bore, a piston assembly in each of said bores including a piston having a domed head and a connecting rod operatively connected to said piston for reciprocating same between top dead centre and bottom dead centre, a crankshaft mounted for rotation at the base of said block, said connecting rods being operatively connected to said crankshaft and an oil pan enclosing the lower end of the cylinder bores and said crankshaft, said cylinder head including a camshaft mounted for rotation thereon and being operatively connected to said crankshaft, at least two inlet-and-scavenger valves mounted on said cylinder head and being operatively connected with said combustion chamber of each of said cylindrical bores, a rocker arm operatively mounted on said cylinder head and operatively engaging said inlet-and-scavenger valve by one end thereof, a cam lobe for each rocker arm formed on said cam shaft operatively connected with the other end of said rocker arm, said cam lobes having a wide area of contact with said rocker arm to control the opening, closing and duration of opening of said inlet-and-scavenger valve and exhaust port located in the lower side of the cylinder walls of the cylinder bores inclining downwardly and outwardly through the cylinder walls and being covered and uncovered by the reciprocating piston passing thereby, the improvement wherein the cam lobe opens said inlet-and-scavenger valve at approximately 110° after top dead centre and closes said inlet-and-scavenger valve at approximately 83° after bottom dead centre thereby maintaining said inlet-and-scavenger valve open through approximately 153°.

H702

CONTROLLING THE MOTION OF A COMPENSATING ROPE IN AN ELEVATOR

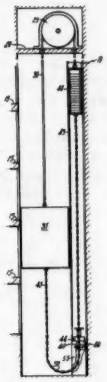
Gary Shively, Seattle, Wash.; Gordon E. Means, Bloomington, Calif., and Robert Staniec, Monee, Ill., assignors to Otis Elevator Company, Farmington, Conn.

Filed Dec. 15, 1987, Ser. No. 133,408
Int. Cl.[4] B66B *5/16*
U.S. Cl. 187—94 10 Claims

1. In an elevator system comprising an elevator car and a counterweight suspended in a hoistway, and an open-looped, flexible compensating rope connected at the ends thereof to said car and said counterweight, the improvement characterized by:

guide means disposed within said hoistway in engagement with said compensating rope for laterally restraining said

rope, thereby preventing said rope from striking said car or the walls of said hoistway due to dynamic changes in

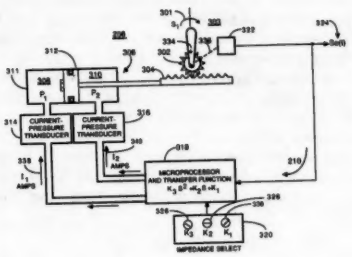


the geometry of said loop as said car and counterweight move within said hoistway.

H703
MANUAL CONTROL APPARATUS WITH ELECTABLE MECHANICAL IMPEDANCE

Daniel W. Repperger, Vandalia, and Augustus Morris, Jr., Trotwood, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 30, 1987, Ser. No. 79,323
Int. Cl.[4] B64C *13/04*
U.S. Cl. 244—221 **2 Claims**



1. Aircraft controlling apparatus comprising the combination of:

a manually operable electrical output signal generating aircraft control stick apparatus having a first mathematical transfer function:

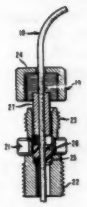
an electrical signal input to mechanical signal output feedback signal apparatus connected between the electrical signal output of said control stick apparatus and a mechanical input node thereof, the combination of said feedback signal apparatus with said control stick apparatus having a second closed loop transfer function which includes selectable dynamic stability characteristic determining mathematical constant terms therein;

means selective of said transfer function dynamic stability determining mathematical constant term values for selecting stability and instability characteristics and characteristics intermediate thereof in said control stick apparatus.

H704
METHOD AND APPARATUS FOR OPTICAL FIBER TRANSMISSION IN A UTILITY CONDUIT CONTAINING A HOSTILE FLUID

Sam Di Vita, W. Long Branch; Edmund E. Maleeki, Rumson, both of N.J., and Loretta J. Kubricky, Ellicott City, Md., assignors to The United of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 10, 1988, Ser. No. 166,336
Int. Cl.[4] G02B *6/44, 6/10*
U.S. Cl. 350—96.23 **12 Claims**



1. The method of introducing an optical fiber into a utility conduit containing a hostile fluid comprising the steps of

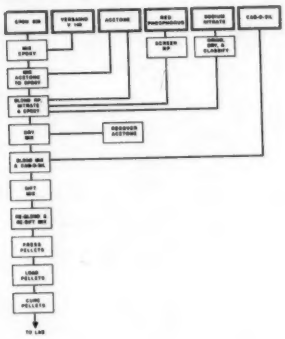
sealing the optical fiber with an inorganic hermetic coating that is impervious to both moisture and said hostile fluid, and

inserting the hermetically-sealed optical fiber into the conduit with a hostile fluid-tight connection.

H705
PROCESS FOR MAKING SMOKE PRODUCING COMPOSITION

Joel H. Selzer, 1 Aspen Tree Ct., Baltimore, Md. 21209, and Michael D. Smith, 160 Nantucket Dr., Port Deposit, Md. 21904

Filed Oct. 9, 1985, Ser. No. 785,709
Int. Cl.[4] D03D *23/00*
U.S. Cl. 149—109.6 **10 Claims**



1. An improved method of preparing a smoke-composition for processing by automated equipment consisting essentially of:

mixing about 933 grams of a liquid epoxy-curing system with about 1.75 grams of acetone per gram of epoxy-curing system,

coating about 22.7 kilograms of red phosphorous with said epoxy-curing system,

blending about 4 kilograms of sodium nitrate and about 4 liters of acetone with said coated mixture,

drying the resulting mixture at about 70° F. for about 60 minutes, and coating said dried misture with about 1.5 percent by weight of fumed silica,

consolidating the coated mixture into pellets weighing between 42.0 and 44.0 grams, loading 28 pellets into the cartridge body, and curing for 48 hours at 140° F.

H706
SILVER HALIDE COLOR PHOTOSENSITIVE MATERIALS

Osamu Takahashi; Nobuo Furutachi, and Masakazu Morigaki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

Filed Aug. 29, 1988, Ser. No. 237,205
Claims priority, application Japan, Aug. 28, 1987, 62-214681
Int. Cl.[4] G03C *1/08*
U.S. Cl. 430—551 **4 Claims**

1. A silver halide color photosensitive material, characterized in that a lipophilic fine grain dispersed in at least one hydrophilic colloidal layer formed on a support contains at least one compound represented by formula (I) and at least one compound represented by formula (II):

$$R_1—SO_2·M_1 \quad (I)$$

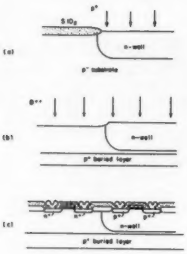
$$R_2—SO_3·M_2 \quad (II)$$

wherein each of R_1 and R_2 represents an aliphatic, aromatic or heterocyclic group having 8 or more carbon atoms; each of M_1 and M_2 represents a hydrogen atom or an inorganic or organic salt-forming atom or atomic group; also M_1 represents a protective group to be hydrolyzed with alkali, and sodium dodecylbenzenesulfonate is excluded from the compounds of formula (II).

H707
METHOD OF PREVENTING LATCH-UP FAILURES OF CMOS INTEGRATED CIRCUITS

Chemning Hu, Hercules, and Kyle W. Terrill, Berkeley, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation of Ser. No. 677,826, Dec. 4, 1984, abandoned. This application Jun. 8, 1987, Ser. No. 59,237
Int. Cl.[4] H01L *21/265*
U.S. Cl. 437—26 **26 Claims**



1. A method of preventing latch-up in an integrated circuit structure comprising the steps of:

providing a lightly ion doped substrate;

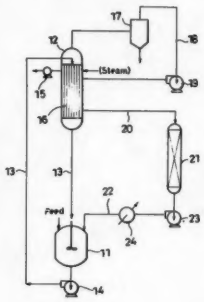
implanting a more highly ion doped buried layer of the same conductivity type beneath the surface of the lightly doped substrate;

fabricating the remainder of the integrated circuit structure on the lightly ion doped substrate.

H708
METHOD OF PRODUCING DIACETONE SORBOSE

Youichi Oka, 3954-13, Oaza-murozumimura, Hikari, Yamaguchi 743; Hitoshi Sawada, 1864-11, Oaza-mitsui, Hikarai, Yamaguchi 743, and Masao Yokoyama, 14-10, Nijigaoka 4-chome, Hikari, Yamaguchi 743, all of Japan

Filed Apr. 8, 1987, Ser. No. 35,847
Claims priority, application Japan, Apr. 17, 1986, 61-89296
Int. Cl.[4] C07G *3/00*
U.S. Cl. 536—18.5 **6 Claims**



1. A method of producing diacetone sorbose by reaction of L-sorbose with acetone in the presence of a ketal formation catalyst in acetone in a reactor, which comprises feeding into the reactor L-sorbose, acetone which has been dehydrated with zeolite activated at a temperature of 200°–300° C. and has a water content of not more than about 50 ppm in an amount of about 6–25 times the weight of the L-sorbose, and a ketal formation catalyst of the class consisting of concentrated sulfuric acid, perchloric acid and iodine, and carrying out the reaction of the L-sorbose with the acetone at reflux temperatures under reduced pressures, while continuously removing water formed in the reaction as a mixture with acetone by distillation at a rate of amounts of about 0.5–2 times the weight of the amount of the acetone initially fed into the reactor per hour and continuously adding to the reaction mixture dehydrated acetone of a water content not more than about 50 ppm at a rate corresponding approximately to the rate at which the mixture of water and acetone is removed from the reaction mixture.

H709
HEATER SYSTEM FOR CURING ROCKET MOTOR MATERIALS

Leonard R. West, Salt Lake City, Utah, assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 19, 1987, Ser. No. 111,845
Int. Cl.[4] H05B *3/40*
U.S. Cl. 219—523 **10 Claims**

1. A heater system for radiant heating of an interior of a rocker motor comprising:

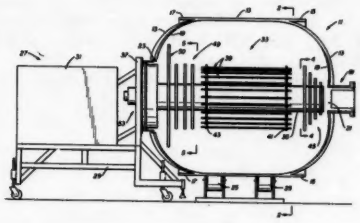
(a) a power and control device;

(b) a heating element system positioned within the interior of said rocket motor;

(c) said heating element system having a plurality of separate heating elements;

(d) said power and control device is operatively connected

to said plurality of separate heating elements to selectively activate said heating elements at predetermined power

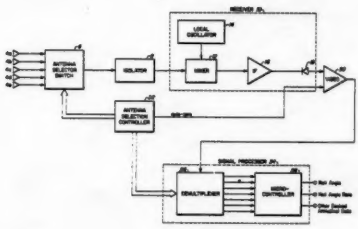


levels to tailor uniform heating of all interior surfaces of the rocket motor.

H710
HORIZON REFERENCE SYSTEM FOR A ROTATING BODY

John O. Hooper; Bruce M. Heydlauff, and Robert B. Dillinger, all of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 2, 1984, Ser. No. 700,981
Int. Cl.[4] G01S *5/04, 3/02*
U.S. Cl. 342—434 7 Claims



1. A horizon reference system for a rotating body comprising:

a plurality of alternate antenna assemblies for receiving microwave energy from the environment;

a receiver;

an antenna selector switch connected between said plurality of alternate antenna assemblies and said receiver for selectively connecting said alternate antenna assemblies to said receiver, one at a time;

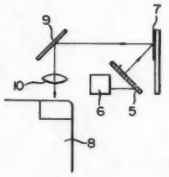
an antenna selection controller connected to said antenna selector switch for sequencing said antenna selector switch from one antenna assembly to another according to a predetermined sequence; and

a signal processor connected to said antenna selection controller and said receiver for calculating attitudinal parameters for said rotating body.

H711
EXPOSURE DEVICE

Kiyoshi Harada; Kazuo Takahashi, and Mikio Kawasaki, all of Hino, Japan, assignors to Konica Corporation, Japan

Filed Jun. 20, 1988, Ser. No. 209,417
Claims priority, application Japan, Jun. 23, 1987, 62-156036
Int. Cl.[4] G03B *27/54*
U.S. Cl. 355—67 4 Claims

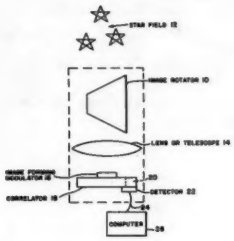


1. A method of printing an image on a photographic material wherein said photographic material is exposed to an image with an exposure light comprising a tabular-shaped light emitting means.

H712
METHOD OF STELLAR NAVIGATION USING AN OPTICAL CORRELATOR

Richard L. Hartman, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 3, 1988, Ser. No. 227,563
Int. Cl.[4] G01B *11/00;* G01J *1/20*
U.S. Cl. 364—456 3 Claims



1. A method of stellar navigation comprising, providing means for imaging a predetermined star pattern onto lens focusing means, directing the focused image to an image forming modulator of a correlator to cause an output to be produced from a matched filter of the correlator, utilizing the output from the correlator as control signals to a computer and utilizing the control signals in the computer with the position of the imaging means to cause the computer to calculate altitude the latitude.

H713
AUTOMATIC TARGET DETECTION AND RECOGNITION

Roger A. May, Longwood, and Frank B. Link, Orlando, both of Fla., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

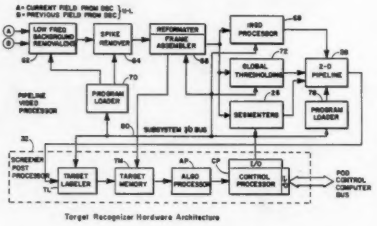
Filed Mar. 15, 1988, Ser. No. 173,859
Int. Cl.[4] G06K *9/48*
U.S. Cl. 364—517 3 Claims

2. A screener post processor (FIGS. 5 and 6) for a target

recognizer system, comprising a target laqbeler, target memory means, an algorithm procdssor, and a control processor;

wherein the target labeler includes targer filter means, adjacent boundary filter means, and adjacent target number sorter means;

wherein the target memory means includes a mass target memory, and two single target memories;



Target Recognizer Hardware Architecture

wherein the target labeler includes means for examining each pixel output from a pipeline video processor and storing into one of said two single segment memories only those which have been tagged by a 2-D pipeline for further evaluation, wherein the target labeler also includes means for appending an identification onto each pixel stored, which is sufficient to sort the stored data into single target groupings.

H714

SERIAL DATA WORD PROCESSING ARRANGEMENT

Vaughn P. McDowell, Fredericksburg, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 26, 1987, Ser. No. 112,579

Int. Cl.[4] G06F *3/153*

U.S. Cl. 364—900 **1 Claim**

1. A serial data EEPROM processing arrangement comprising:

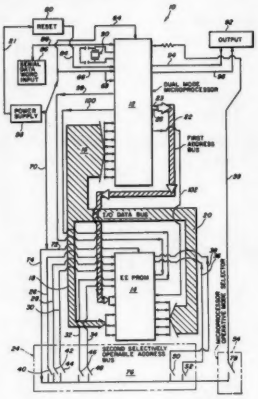
a dual mode microprecessor comprising an accumulator and at least 3 registers;

means for inputting serial data in bytes of 8 bits or less to the accumulator of said dual mode microprocessor;

means for outputting parallel data from the registers of said dual mode microprocessor;

an elecrtonically erasable and programmable read only memory (EEPROM) electrically connected to said dual mode microprocessor;

a data bus connecting the registers of said dual mode microprocessor to said EEPROM;



an address bus interconnecting said dual mode microprocessor with said EEPROM;

a manually selectable address bus comprising switches to designate which area of the EEPROM is addressed by said dual mode microprocessor;

means for manually switching said microprocessor between an encoding and a decoding mode; and

means for outputting an electrical signal when the serial data inputted to said dual mode microprocessor matches the data in said EEPROM.

REISSUES

NOVEMBER 7, 1989

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,106

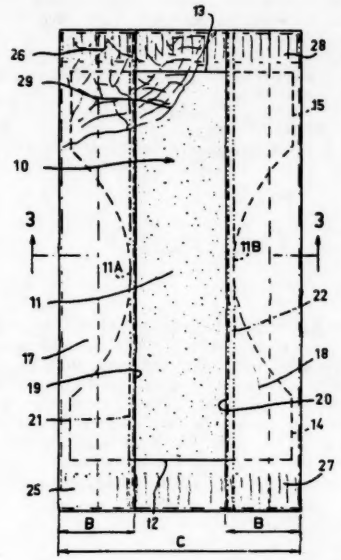
PROTECTOR AGAINST INCONTINENCE OR DIAPER

Bo Beckestrom, Vallingby, Sweden, assignor to Landstingens Inkopscentral, LIC, Ekonomisk Forening, Solna, Sweden

Original No. 4,490,148, dated Dec. 25, 1984, Ser. No. 440,947, Nov. 12, 1982. Application for reissue Dec. 29, 1986, Ser. No. 946,531

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—385.2 **9 Claims**



1. Protector against incontinence or diaper which when extended has an essentially rectangular shape and which comprises a bottom, liquid-tight layer such as a plastic sheet, which carries an oblong absorbent body fixed to the bottom layer, the bottom layer being provided with longitudinal elastic lines such as elastic threads, bands or lines of elastic coating arranged along at least a portion of the length of the protector to gather together the protector in the free state by elastic contraction of the elastic portions and to effect elastic and sealing contact with adjacent bodily parts in the position for use, characterized in that the bottom layer is extended to the sides with side flaps which are folded in over the bottom layer *and over the longitudinal sides of the oblong absorbent body, the bottom layer being extended endwise by ends that are disposed endwise beyond the ends of the oblong absorbent body,* that said *folded over* side flaps are fastened at their end portions to *said extended ends* the bottom layer, [and] *at locations intermediate the width of the protector* that the elastic lines are arranged at the free edges of the side flaps *and are each fixed at both their ends to the side flaps at locations intermediate the width of the protector, and that said folded over side flaps are free intermediate their length so that when the protector is released and allowed to contract due to the tension of the elastic lines, the side flaps intermediate their length are spaced from the absorbent body to form a pouch having an open mouth defined between said free edges of the side flaps.*

Re. 33,107

COMPOSITIONS CONTAINING 1α-HYDROXYCHOLECALCIFEROL FOR TOPICAL TREATMENT OF SKIN DISORDERS AND METHODS EMPLOYING SAME

Shabtay Dikstein, and Abraham Hartzshtark, both of Jerusalem, Israel, assignors to Yissum Research Development Company of the Hebrew University of Jerusalem, Jerusalem, Israel

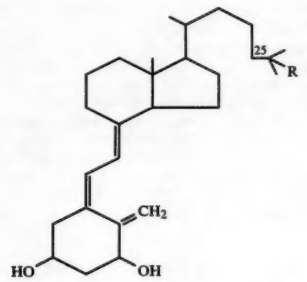
Original No. 4,610,978, dated Sep. 9, 1986, Ser. No. 590,072, Mar. 15, 1984. Application for reissue Sep. 8, 1988, Ser. No. 241,630

Claims priority, application Israel, Mar. 22, 1983, 68196; Mar. 22, 1985, 68195

Int. Cl.[4] A61K *31/59, 31/70*

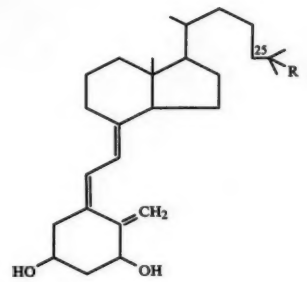
U.S. Cl. 514—46 **30 Claims**

1. A composition for use in topical treatment of skin disorders selected from the group consisting of dermatitis, eczema, psoriasis, lack of adequate skin firmness, dermal hydration and sebum secretion, which comprises between about 0.001 μg and 1.0 μg per gram of the composition of a compound of the formula:



wherein R is H or OH, and a suitable carrier selected from the group consisting of a cream, an ointment and a lotion.

27. A method for treating skin disorders selected from the group consisting of dermatitis, eczema, psoriasis, lack of adequate skin firmness, dermal hydration and sebum secretion which comprises topically applying to the skin an effective amount of a compound of the formula:



wherein R is H or OH.

Re. 33,108

METHOD FOR PREPARING A PRINTED CIRCUIT BOARD

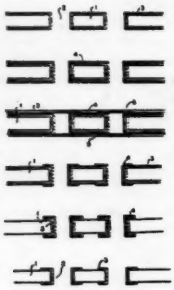
Katsukiyo Ishikawa, Kyoto; Kanji Nishijima, Ibaraki, and Mamoru Seio, Nishinomiya, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Original No. 4,673,458, dated Jun. 16, 1987, Ser. No. 837,767, Mar. 10, 1986. Application for reissue Nov. 16, 1988, Ser. No. 271,710

Claims priority, application Japan, Mar. 8, 1985, 60-47262

Int. Cl.[4] C23F *1/02*; B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—659.1 3 Claims



1. A method for preparing a printed circuit board with plated-through-holes, comprising:

providing a plated board with a number of plated-through-holes,

forming a positive working photoresist on said plated board, exposing said photoresist through a positive mask of circuit pattern placed on said photoresist to an actinic radiation, developing said photoresist on said plated board with an aqueous or a semi-aqueous alkaline solution, thereby removing the exposed area and form an etching resist,

subjecting said resist to an etching to remove copper metal covered with the exposed photoresist on said plated board, and finally removing said resist still remaining on the unexposed area of said plated board,

which is characterized in that the formation of said positive working photoresist is carried out by an electrodeposition process with an anionic or cationic electrodeposition bath containing quinonediazide sulfonic ester bearing acrylic copolymer.

Re. 33,109

CHALCONE DERIVATIVES

Anthony E. Vanstone, Whitton; Graham K. Maile, and Lynn K. Nalbantoglu, both of London, all of England, assignors to Biorex Laboratories Limited, London, England

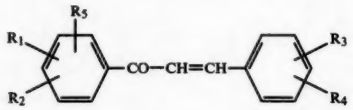
Original No. 4,656,305, dated Apr. 7, 1987, Ser. No. 789,277, Oct. 18, 1985. Application for reissue Apr. 8, 1988, Ser. No. 179,223

Claims priority, application United Kingdom, Oct. 19, 1984, 84-26424

Int. Cl.[4] C07C *69/76*

U.S. Cl. 560—54 12 Claims

1. A chalcone derivative of the general formulae:



(IIa)

wherein R_1 is a carboxyalkyoxy radical, R_2 is an unsaturated, straight-chained or branched aliphatic hydrocarbonyloxy radical, R_3 is a hydrogen atom, a hydroxyl group or an alkoxy radical, R_4 is a carboxyalkoxy or carboxyalkylcarbonyloxyalkyl radical or a carboxylic acid group and R_5 is a hydrogen or halogen atom *with the proviso that when R_4 is a carboxymethoxy radical R_3 is other than a hydrogen atom*; and the nontoxic inorganic and organic salts of those compounds containing at least one carboxylic acid [or sulphonic acid] group.

PLANT PATENTS

GRANTED NOVEMBER 7, 1989

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,053

AFRICAN VIOLET PLANT NAMED GEMINI

Reinhold Holtkamp, Sr., Werther Strasse 112, D4294 Isselburg, Fed. Rep. of Germany

Filed Sep. 30, 1988, Ser. No. 251,251
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—69 **1 Claim**

1. A new and distinct cultivar of African violet named Gemini, as described and illustrated, and particularly characterized by its single, bright pink flowers with darker pink center; strong, upright flower stems that curve toward the center to form a compact bouquet above the leaves; medium green, serrated girl-type leaves; profuse flowering, vigorous growth habit, flowering 10–11 weeks after potting, and its long-lasting and non-dropping flowers.

7,054

CARNATION PLANT NAMED MILLY

Flavio Sapia, Via Ducca Degli Abrozzi (Strada Viletta), San Remo, Italy

Filed Oct. 18, 1988, Ser. No. 260,377
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—71 **1 Claim**

1. A new and distinct carnation plant named Milly, as described and illustrated.

PATENTS

GRANTED NOV. 7, 1989

ERRATA

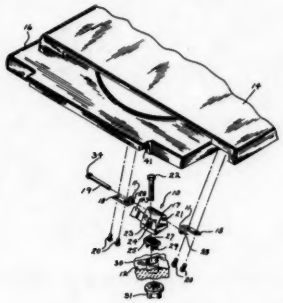
For CLASS	See PATENT NO.
562-550	4,879,070
562-882	4,879,071
524-430	4,879,120
428-218	4,879,138
430-126	4,879,184
525-474	4,879,334
514-383	4,879,385
549-248	4,879,387
428-035	4,879,430
341-171	4,879,488
235-385	4,879,540
343-713	4,879,570
367-020	4,879,719

PATENTS

GRANTED NOVEMBER 7, 1989

GENERAL AND MECHANICAL

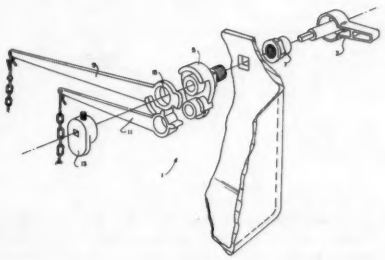
4,878,255
ADJUSTABLE HINGE ASSEMBLY
Ronald N. Grimstad, Sheboygan, and Michael F. Daly, Manitowoc, both of Wis., assignors to Kohler Co., Kohler, Wis.
Filed Dec. 14, 1987, Ser. No. 132,342
Int. Cl.[4] A47K *13/12*
U.S. Cl. 4—236 **4 Claims**



1. A toilet cover assembly for adjustably mounting a toilet covering member to the rearward portion of a toilet, the toilet being of the type having at least one fastening opening extending downwardly in said rearward portion, said assembly comprising:
- a toilet cover having a pocket formed in its lower rearward portion;
- a bushing positionable in said fastening opening, said bushing having a throughbore;
- a hinge block mountable over said bushing and having a substantially horizontal hinge post receiving bore;
- a hinge post insertable in the hinge post receiving bore, said hinge post including an enlarged head at a first end;
- an opening in said hinge block alignable with said bushing throughbore;
- a fastener extendable into said hinge block opening and bushing throughbore to assist in connecting the hinge block and bushing to said toilet;
- recess and projection means extending between said hinge block and bushing whereby said block may be fixed relative to said bushing at at least two different positions; and
- mountable bracket means for rotatably coupling said hinge post and said hinge block to said toilet cover, said mountable bracket means coupling said hinge post to said toilet cover such that said enlarged head of said hinge post is captured in said pocket.

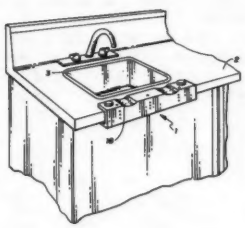
4,878,256
SINGLE HANDLE DUAL FLUSHING TOILET
J. Jewell Bagwell, 103 Hicks Rd., Greenville, S.C. 29605
Filed Jul. 27, 1987, Ser. No. 77,882
Int. Cl.[4] E03D *1/14*
U.S. Cl. 4—326 **5 Claims**

1. In a toilet having a tank, a source of water into the tank, and two independent control valves at different water levels within the tank for effectuating both light and heavy flushes, the improvement comprising:
- a single handle on the outside of said tank in communication with said independent control valves through a first pivot axis extending through said tank;
- a first lever inside said tank connected to said handle about said first pivot, axis a first lever inside of said tank which rises when said handle is depressed for movement about said axis in one direction, said lever being lowered when said handle is lifted for movement about said pivot axis in an opposite direction;
- a second lever in communication with said first lever said second lever having a pivot axis different from said first lever said second lever rises when the first lever is lowered upon raising said handle;
- a gear tooth on said second lever;



- actuator means mounted about said first pivot axis of said first lever, means for connecting each of the levers to a respective one of the two independent control valves;
- said actuator means having a gear tooth for engaging said gear tooth of said second lever and causing said second lever to pivot about said different axis and
- whereby the raising of each lever effectuates a different flush allowing for water conservation.

4,878,257
COUNTER-MOUNTED SPLASH GUARD, AND METHODS OF CONSTRUCTING AND UTILIZING SAME
Elizabeth V. Hardin, 18227 Valade, Riverview, Mich. 48192
Filed Aug. 6, 1987, Ser. No. 82,302
Int. Cl.[4] E03C *1/181*
U.S. Cl. 4—658 **4 Claims**



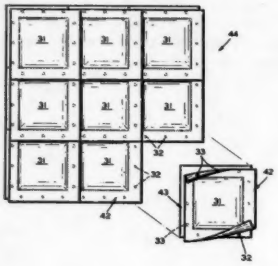
1. A counter mounted splash guard apparatus comprising:
- an elongate, channel-shaped guard body element having an inside and an outside;
- absorption means fittable within said inside of said guard body for absorbing liquids;
- means for fastening said apparatus to an end portion of a counter;
- said absorption means being removably attachable to said inside of said guard body; and
- said removable attachment is effected by removably fastenable fabric capable of being fastened to itself.

4,878,258

MODULAR ENERGY SAVING COVERING

Susan D. Casey, 243 W. 72nd St. #7, New York, N.Y. 10023

Filed Sep. 19, 1988, Ser. No. 246,362
Int. Cl.[4] A47G *9/06*
U.S. Cl. 5—420 **24 Claims**



1. An energy saving covering module, adapted to be detachably connected to a plurality of like modules, comprising:

a central body portion having a pair of spaced apart walls attached together about peripheral edges defining an interior space therebetween; an insulating material positioned in said interior space;

a first flange extending from said peripheral edges of said central body portion;

a second flange extending from at least one of said peripheral edges of said central body portion beyond an outer peripheral edge of said first flange; and

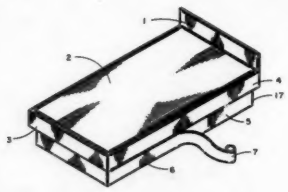
fastener means attached to one of said first flange and said second flange whereby said fastener means are adapted to cooperate with fastener means attached to adjacent ones of said covering modules to form a modular covering sheet with said second flanges overlying said first flanges of adjacent ones of said covering modules forming an infiltration barrier to the transmission of heat energy and water vapor from one side of the modular covering to the other side of the modular covering.

4,878,259

WATERBED PEDESTAL WRAP

Anthony C. Lupo, Orlando, Fla., assignor to Sunny's Waterbeds & Accessories, Inc., Orlando, Fla.

Continuation of Ser. No. 70,337, Jul. 6, 1987, abandoned. This application Oct. 11, 1988, Ser. No. 257,135
Int. Cl.[4] A47C *27/08, 31/00*
U.S. Cl. 5—451 **5 Claims**



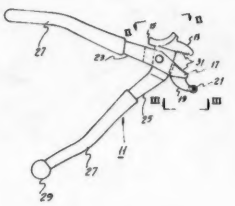
1. In combination with a waterbed having a frame and a watermattress resting on a generally rectangular pedestal having four substantially planar outer surfaces, a rollable, flexible cover or wrap comprised of a decorative material having attached, integral fastening means adapted to cooperate with the outer surfaces of said pedestal to removably secure the cover in direct contact with said outer surfaces, said cover being of a sufficient length and width to cover a substantial portion of all four outer surfaces.

4,878,260

COMBINATION TOOL

William A. Tunningley; Martha A. Tunnungley, and Emanuel M. Pupulidy, all of 503 Valasquez Dr., Osprey, Fla. 33559

Continuation of Ser. No. 59,537, Jun. 8, 1987, abandoned. This application Aug. 26, 1988, Ser. No. 237,640
Int. Cl.[4] B25B *7/22*
U.S. Cl. 7—129 **4 Claims**



1. A combination tool for scribing and separating glass, comprising:

a first elongated member having a longitudinal axis having a first end and a second end; a second elongated member having a longitudinal axis having a first end and a second end;

wherein said first member comprises an elongated intermediate section having a longitudinal axis, said intermediate section being pivotally secured to said second member so that said first and second members pivot with respect to a preset axis;

said first end of said first member includes a handle portion and a tapper ball;

a finger rest on said first member between said intermediate section and said second end and an upper serrated jaw attached to said second end of said first member wherein said finger rest comprises a curved member having a width along said axis greater than the width of said first member along said axis at its connection with said finger rest;

said first end of said second member includes a handle portion; and

said second end of said second member includes a rotatably mounted cutter wheel and a lower serrated jaw;

wherein said lower serrated jaw at said second end of said second member lies in a plane substantially parallel to the longitudinal axis of said second member;

said axis of said intermediate member extending laterally outwardly at an acute angle with respect to the axis of said first member;

wherein said upper serrated jaw lies in a plane substantially perpendicular to the longitudinal axis of said midsection.

4,878,261

SWEEPER WITH PIVOTALLY MOUNTED DUST BIN

Henry J. Rosendall, Grand Rapids, Mich., assignor to Bissell, Inc., Grand Rapids, Mich.

Filed Aug. 4, 1988, Ser. No. 228,259
Int. Cl.[4] A47L *11/08*
U.S. Cl. 15—41 R **11 Claims**

1. A floor sweeper comprising:

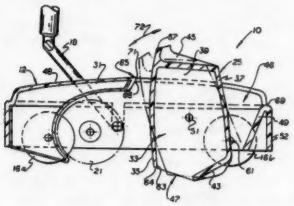
a housing;

a plurality of wheels rollingly supporting said housing on a floor surface;

a brush element rotatively mounted in said housing for sweeping debris from the floor surface;

a dust bin for receiving and collecting the debris swept up by said brush element, said dust bin including an opening through which the debris is passed into and out of said dust bin, said dust bin being pivotally mounted to said housing for movement between an operative position wherein said opening is positioned to receive within said dust bin the debris from said brush, and a dumping position wherein said opening is positioned downwardly to effect release of the debris contained therein;

a dust knocker stop fixed to said housing and oriented such that said dust bin can be rocked to repeatedly knock against said dust knocker stop when said dust bin is in said dumping position to dislodge any debris retained therein;



said dust bin and said dust knocker stop being oriented such that said dust bin opening be directed substantially downwardly throughout the knocking of said dust bin against said dust knocker stop;

said dust bin further being oriented in a substantially vertical orientation in said dumping position, wherein said dust bin is rocked only slightly from said vertical orientation when knocking said dust bin against said dust knocker stop, so that retention of the debris by walls defining said bin and said opening is minimized; and

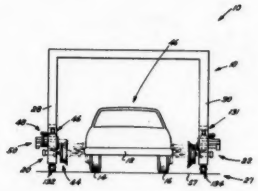
said dust bin further being swung within a range of substantially twenty degrees to each side of a true vertical position when rocking said dust bin to knock against said dust knocker stop.

4,878,262

AUTOMOTIVE SCRUBBER

Frank L. Stufflebeam, Grimes, and James A. Nelson, Des Moines, both of Iowa, assignors to Ryko Manufacturing Company, Grimes, Iowa

Filed Feb. 29, 1988, Ser. No. 162,168
Int. Cl.[4] B60S *3/06*
U.S. Cl. 15—53 B **14 Claims**



1. A scrubber for an automotive vehicle comprising, in combination:

a frame;

brush means for wiping said vehicle, said brush defining an angular orientation;

extension means for pushing said brush means toward said vehicle, said extension means including a first extension arm, interconnected to said brush means , and a second extension arm, interconnected to said frame, said angular orientation of said brush being defined by said first arm with respect to said frame, said first and second arms being slidably interconnected, whereby said first arm may slide along said second arm toward said automotve vehicle;

pivot means for allowing said brush means to change angular orientation; and

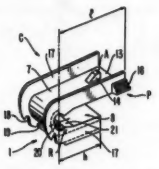
centering means to urge said brush toward a predetermined angular orientation.

4,878,263

CONNECTOR DEVICE TO MOUNT A WINDSHIELD WIPER CONTACT CLIP, AND CLIP ENDOWED WITH SUCH A CONNECTOR DEVICE

Bernard Raymond, Paris, France, assignor to Valeo Systemes D'Essuyage, Issy-Les-Moulineaux, France

Filed May 6, 1988, Ser. No. 190,822
Claims priority, application France, May 6, 1987, 87 06382
Int. Cl.[4] B60S *1/40*
U.S. Cl. 15—250.32 **14 Claims**



1. A connector device for mounting a windshield wiper contact clip on a curved end of a wiper arm, the windshield wiper contact clip comprising a clip body having a pair of upstanding walls and a pair of transverse edges defining an opening in the clip body, the windshield wiper contact clip further comprising a transverse shaft extending across the opening between the pair of upstanding walls, said connector device comprising:

a substantially U-shaped connector body for receiving a concave portion of the curved end of the wiper arm thereabout, said substantially U-shaped connector body comprising a first leg, a second leg, and a curved base interconnecting said first and second legs;

fastening means on said connector body for fastening said connector body to the wiper arm, said fastening means comprising a first component on said first leg adapted for cooperation with a complementary component on the wiper arm;

receiving means on an inside portion of said curved base of said substantially U-shaped connector body for receiving and holding the transverse shaft of the windshield wiper contact clip;

said first leg comprising gripping means at a distal end thereof projecting transversely therefrom, and said first leg having a length greater than the length of said second leg and greater than the distance from the transverse shaft of the clip body to one of the transverse edges of the clip body, such that when said connector body holds the transverse shaft said first leg will extend beyond the transverse edge of the clip body so that said gripping means will be located beyond the longitudinal extent of the upstanding sidewalls of the clip body.

4,878,264

CLEANING EQUIPMENT

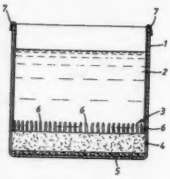
Ronald A. Young, London, Great Britain, assignor to Scot Young Service Systems Limited, United Kingdom

Filed Oct. 7, 1988, Ser. No. 255,040

Claims priority, application United Kingdom, Oct. 9, 1987, 8723799

Int. Cl.[4] A47L *13/50*

U.S. Cl. 15—264 10 Claims



1. Cleaning equipment comprising a container for cleaning liquid, wherein the container is provided with a dirt trap comprising a dirt-receiving element of mat or pad-like form which is positioned in the container to receive dirt settling under gravity from the contained liquid with the dirt collecting in, or passing through so as to be trapped below, the element, the form and structure of the element being such that disturbance of the liquid in the container cannot wash the collected dirt back out from or through the element to any significant extent.

4,878,265

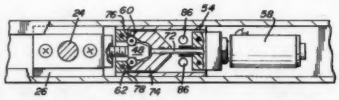
HOLD-OPEN MECHANISM FOR USE WITH A DOOR CLOSER

Lanny E. Nesbitt, Strasburg, Pa., assignor to Dorma Door Controls, Inc., Reamstown, Pa.

Filed Sep. 7, 1988, Ser. No. 241,917

Int. Cl.[4] E05C *17/04;* E05F *3/00*

U.S. Cl. 16—49 9 Claims



1. A releasable door hold-open mechanism for use with a door closer, comprising an enclosed track a latch element coupled to the door closer and mounted in said track for rectilinear movement along said track during door opening and closing movements, and a latch assembly disposed in said track and adapted to engage and retain said element to hold the door in an open limit position, said latch assembly being selectively positionable for substantially the length of said track to determine the open limit position, means coupled to said latch assembly and engageable with said track for selectively locking said latch assembly from movement relative to said track, whereby said latch assembly determines the open limit position, said latch assembly comprising a reciprocable roller engageable with said element, a clevis engageable with said roller to activate said roller to a latching position, and means for biasing said clevis to a roller-activating position, said clevis being so disposed and arranged as to cam said roller to an element-retaining position when said roller is in said roller-activating position.

4,878,266

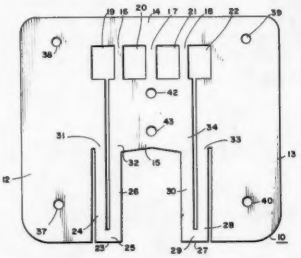
EASEL HINGE

Wilson J. Cubides, Somerset, N.J., assignor to Art Materials Service, Inc., N.J.

Filed Apr. 4, 1989, Ser. No. 333,176

Int. Cl.[4] E05D *1/02*

U.S. Cl. 16—225 8 Claims



7. An easel hinge comprising a sheet of material having: a first portion with at least one leg section and a hinge support section;

a second portion adjacent said leg section and interconnected with said hinge support section by at least one bendable hinge element;

at least one straddle element spaced from said hinge element and interconnecting said leg section with said second portion;

first attachment means adapted to enable said first portion to be secured to one panel of an easel; and

second attachment means adapted to enable said second portion to be secured to another panel of the easel,

whereby said easel panels may be angularly moved relative to each other to cause bending of said hinge elements, said straddle element limiting the angular movement of the panels.

4,878,267

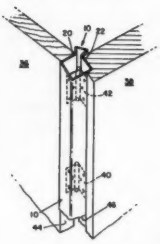
RESISTING ENTRY OF AN OBJECT INTO A SPACE BETWEEN THE HINGED EDGE OF A DOOR MEMBER HINGEDLY ATTACHED TO A ASSOCIATED JAMB MEMBER AND A SURFACE OF THE JAMB MEMBER

James F. Roach, 28 Pine St., Carver, Mass. 02330, and Kevin V. Roach, 363 Fosdick Rd., North Carver, Mass. 02330

Filed Oct. 11, 1988, Ser. No. 256,319

Int. Cl.[4] E05D *11/00*

U.S. Cl. 16—250 16 Claims



1. A device for resisting entry of an object into a space between the hinged edge of a door member hingedly attached to an associated jamb member and a surface of said jamb member, said device comprising,

a door member;

a jamb member; and

an elongated sheet of material thin enough to be placed in said space without impeding the closing of said door member to said jamb member, said sheet having a first and second strip, said first strip being fixedly connected within the said space to said door member on a surface thereof that is unexposed when said door is closed and said second strip being fixedly connected within said space to said jamb member on a surface thereof that is unexposed when said door is closed, said first and second strips being connected by a third strip attached to said first and second strips, said third strip cooperating with said first and second strips to resist entry into said space when said door member and jamb member are brought together.

4,878,268

DEVICE FOR DRAWING ROVES OR SLIVERS OF FIBERS ON A SPINNING MACHINE

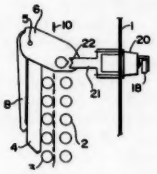
Pierre Mirabel, and Marcel Schoumacher, both of Roanne, France, assignors to Devtex, France

Filed Jul. 21, 1988, Ser. No. 222,538

Claims priority, application France, Aug. 28, 1987, 87 12176

Int. Cl.[4] D01H *5/74, 5/56*

U.S. Cl. 19—258 **5 Claims**



1. In a device for drawing roves or slivers of fibers on a spinning machine with a view to converting this material into spun yarns, of the type incorporating pendulous arms, constituted essentially by an assembly comprising, mounted on the support frame of the machine, a series of splined shafts extending over the whole length of the machine and common to all the work positions, said shafts being driven in rotation and, on the other hand, presser elements constituted by rollers mounted on a pivoting support arm comprising means ensuring pressure of the presser rollers against the splined shafts,

the pendulous arm bearing the presser elements is assembled on the frame of the machine via a support comprising means for simultaneously separating the presser rollers parallel to the line of splined shafts.

4,878,269

CORD FASTENER

Joseph A. Anscher, Huntington Bay, N.Y., and James Dillner, Lancaster, Pa., assignors to National Molding Corp., Farmingdale, N.Y.

Continuation of Ser. No. 905,831, Sep. 10, 1986, abandoned. This application Jul. 1, 1988, Ser. No. 218,501

Int. Cl.[4] F16G *11/00*

U.S. Cl. 24—115 G **20 Claims**

1. A cord-fastener which comprises:

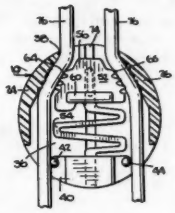
a housing having a cavity extending therethrough;

a locking element disposed in said cavity;

said locking element comprising a stationary segment fixedly engaged within said housing by resiliently separable fastener means comprising congruently shaped protrusions and holes cooperatively disposed on surfaces of said stationary segment and said cavity and a movable segment connected to said stationary segment by a spring means;

a cord passage defined by opposing surfaces of said cavity and said movable segment; and

said spring means urging said movable segment so that said opposing surfaces restrict said passage wherein said movable segment, stationary segment and spring means are integrally molded as one piece.



4,878,270

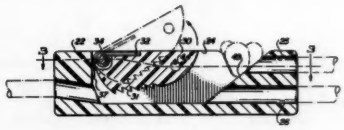
ROPE TIE-DOWN APPARATUS

Myron M. Westerkamp, 2526 E. Solano Dr., Phoenix, Ariz. 85016

Filed May 9, 1989, Ser. No. 349,427

Int. Cl.[4] F16G *11/00*

U.S. Cl. 24—132 R **19 Claims**



1. A rope tie-down clamp apparatus including in combination:

an unattached housing;

a first longitudinal passage through said housing for a length of rope;

a second longitudinal passage through a portion of said housing, said second passage being parallel to said first passage;

means on said housing for securing one end of said rope to said second passage through said housing to form a loop of rope outside said housing between said first and second passages;

a clamping cam mounted for movement in said housing from a position engaging said rope in said first passage to a position out of engagement with said rope;

means for normally biasing said clamping cam into engagement with said rope for wedging said rope tightly between said cam and a portion of said first passage in response to forces on said rope in a first direction relative to said housing, movement of said rope relative to said housing in a second direction, opposite to said first direction, causing said clamping cam to be urged out of engagement with said rope; and

means for manually moving said clamping cam out of engagement with said rope.

4,878,271

TONGUE ASSEMBLY

Alexander P. Kitokovsky, Oak Park, Mich., assignor to TRW Vehicle Safety Systems Inc., Lyndhurst, Ohio

Filed Oct. 13, 1988, Ser. No. 256,983

Int. Cl.[4] A44B *11/10*

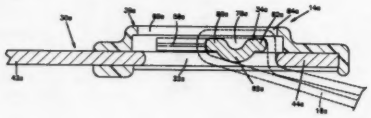
U.S. Cl. 24—194 **7 Claims**

1. A tongue assembly for use in a safety apparatus having a

belt for restraining movement of an occupant of a vehicle, said tongue assembly comprising:

a base having an opening through which the belt can extend;

a bar spanning the opening in said base and enabling the belt to extend through the opening, across the bar and back through the opening, said bar having first and second end portions and an intermediate portion disposed between said first and second end portions, said intermediate portion of said bar having surface means for engaging the belt, said bar being slidable relative to said base to enable said intermediate portion of said bar to engage the belt and press the belt against the base; and



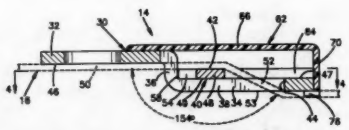
a cover supported on said base and engaging said first and second end portions of said bar to retain said bar on said base and to guide movement of said bar relative to said base, said cover being spaced from the surface means of said intermediate portion of said bar.

4,878,272

TONGUE ASSEMBLY

Alexander P. Kotikovsky, Oak Park, Mich., and Robert E. Tait, Midland, Canada, assignors to TRW Vehicle Safety Systems Inc., Lyndhurst, Ohio

Filed Dec. 5, 1988, Ser. No. 280,148
Int. Cl.[4] A44B *11/10*
U.S. Cl. 24—196 **12 Claims**



1. A tongue assembly for use in a safety apparatus in which a belt restrains movement of an occupant of a vehicle, said tongue assembly comprising:

a base having a flat leading end portion, a flat trailing end portion which is offset from and extends parallel to said leading end portion and a connector portion extending between said leading and trailing end portions, said base having an opening which extends through said trailing end portion and through said connector portion, said trailing end portion having a trailing edge which is spaced from said connector portion and which at least partially defines said opening; and

a bar disposed on said trailing end portion of said base, said bar having first and second end portions and an intermediate portion extending between said first and second end portions of said bar and spanning said opening;

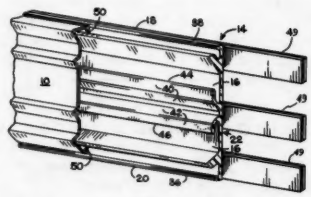
said bar having a first position disposed adjacent said trailing edge and a second position disposed adjacent said connector portion, and when said bar is in said second position the belt has a first straight portion extending from said bar and disposed in a side-by-side relationship with said leading end portion of said base and a second straight portion extending from said bar and disposed in engagement with said trailing edge.

4,878,273

METAL TRIM ATTACHING SYSTEM

Philip B. West, Detroit; Robert D. Major, Rochester Hills, and Gary D. Fuerstenberg, Monroe, all of Mich., assignors to Hoover Group, Aluminum Products Division, East Detroit, Mich.

Filed Oct. 23, 1987, Ser. No. 111,638
Int. Cl.[4] B32B *7/08*
U.S. Cl. 24—289 **23 Claims**



1. A metal trim attaching assembly for securing a molding strip of metal, upon a supporting surface having a contour, the assembly comprising: a plastic isolator extending a length along which a mid-axis extends, the isolator being integrally formed and having a generally symmetrical cross-section about the mid-axis, the isolator including:

a substantially flexible mounting plate longitudinally extending said length and having lateral edges and a mounting surface, the mounting surface yieldable to conform generally to the contour of the supporting surface,

two retaining flanges extending said length, each retaining flange depending from the mounting plate proximate to a corresponding edge of the mounting plate, each flange projecting at an acute angle away from the mounting plate and toward said corresponding edge, the retaining flanges being grippable by the metal strip to hold the strip into structural relationship with the mounting plate,

two edge lips formed integral with the mounting plate, each edge lip disposed at a corresponding edge of the mounting plate and extending said length, each edge lip depending from the mounting plate so as to restrict the trim from moving substantially parallel to and toward said corresponding edge and said metal strip interlocked between respective flanges and edge lips, and

a yieldable lever bracket formed integral with the mounting plate and extending said length of said mounting plate, said lever bracket having a cross-section with a central portion with a pair of angular arms extending therefrom and said cross-section being continuous the length of said mounting plate, said arms each projecting away from the mounting plate to a free end, the free ends resiliently movable toward the mounting plate as the lever yields toward the mounting plate, the free ends being adapted to press against the trim to support the trim and effect a supportable leverage; and

adhesive means securable to said mounting surface and to the supporting surface for securing the isolator to the supporting surface.

4,878,274

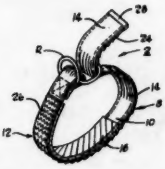
SECUREMENT SYSTEM

Henry R. Patricy, 2640 Lost Nation Rd., Willoughby, Ohio 44094

Filed Jul. 13, 1988, Ser. No. 218,673
Int. Cl.[4] A44B *18/00*; A61B *17/12*
U.S. Cl. 24—306 **7 Claims**

1. A securement device of the type adapted for mounting an object, such as a hammock, snow skis or the like to a support member or to one another, said securement device including a generally flexible, elongated body member having a predeter-

mined length, said body member having inner and outer sections that are joined together by stitching, said inner section being made from a relatively elastic fabric polymeric material and further including a frictional gripping member, said friction gripping member being made from a rubber material having corrugations adapted for frictional gripping engagement with a support member, said outer section further including a female Velcro portion and a male Velcro portion to



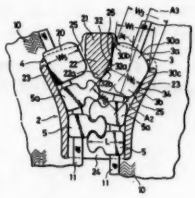
provide a frictional coupling upon contact with one another for holding said securement device in a closed configurations, one end of the body member having a retaining ring element adapted for receiving the opposite end of said body member such that the free end of the body member can be inserted through a looped around said ring element and secured in place by frictionally pressing the male and female portions of said Velcro system into engagement with one another.

4,878,275

SEPARABLE SLIDE FASTENER

Hidetaka Kazui, Compton, Calif., and Tomiyoshi Takano, Kurobe, Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan

Filed Sep. 17, 1987, Ser. No. 97,816
Int. Cl.[4] A44B *19/36*
U.S. Cl. 24—436 **3 Claims**



1. A separable slide fastener, comprising:

(a) a pair of fastener stringers each including a pair of stringer tapes and a pair of rows of fastener elements mounted on said stringer tapes along respective inner longitudinal edges thereof;

(b) a slider threaded on said pair of rows of fastener elements for movement therealong to close and open the slide fastener, said slider including a slider body having a wedge-shaped neck disposed centrally at a flared front end thereof and a pair of flaring side flanges disposed along opposite sides of said slider to define with said neck a Y-shaped guide channel for passage of said pair of rows of fastener elements, said guide channel having a pair of branches diverging toward said front end of said slider, said wedge-shaped neck having at its lower end a distal end and at its opposite sides respective intermediate peaks;

(c) a separable bottom-end-stop assembly mounted on adjacent bottom ends of said fastener stringers; and

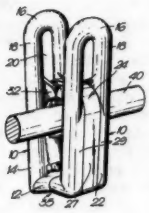
(d) a top end stop mounted on said inner longitudinal edge of one of said stringer tapes, said top end stop having a maximum width (W3), as measured perpendicularly to said inner longitudinal edge of said one stringer, larger than the width (W4) of each of said branches of said guide channel, said top end stop being composed of continuous and integral first and second half parts and having an inner recessed surface engageable with said neck of said slider and an opposite chamfered surface engageable with the flaring side flange, each of said first and second half parts having an upper half portion and a lower half portion, respectively, of the inner recessed surface inwardly inclined with respect to said inner longitudinal edge of said one stringer tape, thus defining an obtuse angle therebetween, each of said first and second half parts having a maximum width (W1), (W2), as measured perpendicularly to the upper half portion and the lower half portion, respectively, of the inner recessed surface, equal to or slightly smaller than the width (W4) of each said branch of said guide channel; so that when said top end stop is received into the branch of the guide channel, the recessed surface of the top end stop engages the intermediate peak of the neck and also the distal end of the neck and the chamfered surface of the top end stop engages the inside surface of the flaring side flange of the slider, thus providing three-point supporting engagement between the neck and the flaring side flange.

4,878,276

SPRING CLIP

Peter G. A. Morrish, 16 Plantagenet Road, Barnet, Hertfordshire, and William B. Edwards, Radlett, both of England, assignors to Peter G. A. Morrish, United Kingdom and Priscilla D. Morrish, United Kingdom

Filed Jun. 16, 1988, Ser. No. 207,245
Claims priority, application United Kingdom, Jun. 25, 1987, 87 14862; Sep. 25, 1987, 87 22720
Int. Cl.[4] A44B *21/00*; A41D *27/22*
U.S. Cl. 24—511 **10 Claims**



1. A spring clip comprising:

a pair of levers having two ends,

said levers including a handle portion toward one of said ends thereof and a jaw portion toward the other of said ends,

means defining a fulcrum intermediate said ends about which said levers are relatively pivotable for mutual approach or parting of said jaw portions,

spring means urging said other of said ends for mutual approach to form a nip, said spring means comprising a substantially U-shaped spring member having two arms and a base joining said arms, said arms lying respectively along said jaw portions of said levers and said base bridging between the levers, said fulcrum being adjacent to said base,

means for engaging said spring clip to a bar,

said engagement means being intermediate said fulcrum and said nip comprising a resilient clip having a closed base and a restricted open mouth, said open mouth being disposed towards said nip, and

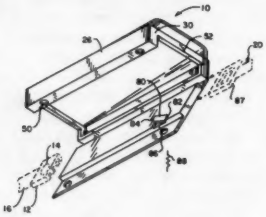
said resilient clip being integral with said spring member.

4,878,277

CHILD PROOF SEAT BELT RESTRAINT

Peter Portuese, 39 Huron St., Port Jefferson Station, N.Y. 11776

Filed Dec. 28, 1988, Ser. No. 291,172
Int. Cl.[4] A44B *11/26*
U.S. Cl. 24—633 7 Claims



1. A child proof cover for preventing a child from releasing a seat buckle assembly, which includes a first buckle element having a release control and which is operatively attached to a first seat belt and a second buckle element which is operatively attached to a second seat belt and which is adapted to be releasably coupled to the first buckle element to securely hold a child in place in a motor vehicle seat, the cover comprising:

a housing having a top and a bottom which co-operate to define a seat belt buckle assembly accommodating chamber within said housing, said housing including a first slot for accommodating the first seat belt and a second slot for accommodating the second seat belt when the buckle assembly is located inside said chamber;

said housing being sized and configured to completely encase the seat belt buckle assembly and including a finger access channel defining means on said top, said channel defining means being sized to define an access channel that extends for at least two and one-half inches before access to said buckle release control is provided via said channel to provide access to the buckle assembly release control from outside of said chamber to define a channel that is too long for a young child to insert his fingers far enough into said channel to operate the buckle release control yet short enough for an adult to insert his finger into said channel far enough to operate said buckle release control;

a buckle separation preventing means on said housing which includes a tab and a biasing means urging said buckle separation preventing means into a buckle separation preventing position and a button means for moving said buckle separation preventing means out of said buckle separation preventing position.

4,878,278

METHOD FOR MANUFACTURE OF PAPER MAKING FABRICS

Chien-Yeh Hsu, Greer; Frank J. McGee, Seneca, and Roger L. Banks, Taylors, all of S.C., assignors to Wangner Systems Corporation, Greenville, S.C.

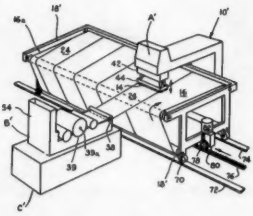
Continuation of Ser. No. 81,750, Aug. 5, 1987, abandoned. This application Apr. 29, 1988, Ser. No. 188,296
Int. Cl.[4] D04H *1/46*
U.S. Cl. 28—142 6 Claims

1. A method of producing a papermaking wet felt which travels about press rolls in a machine direction on a papermaking machine, said method being of the type wherein a fiber batt is needled to a base fabric on a needle loom having a main needling module, said method comprising:

(a) conveying a base fabric on a movable carriage about a plurality of carriage rollers for endless travel in said machine direction;

(b) producing a fiber batt on a carding machine having a main carding cylinder with an axis of rotation parallel to an axis of rotation of said carriage rollers so that said fiber batt is delivered generally in longitudinal alignment with the direction of travel of said base fabric;

(c) moving said carriage on which said base fabric travels endlessly in said transverse direction to cause said base fabric to move relative to said fiber batt transverse to said machine direction in a manner that said fiber batt is laid upon said base fabric generally in said machine direction across a prescribed width of said base fabric;



(d) tacking said machine direction oriented fiber batt to said base fabric by needling while said fiber batt is laid upon said base fabric moving in said transverse direction to provide a lightly tacked fiber batt across said width of said base fabric; and

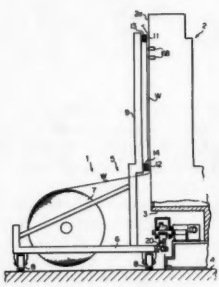
(e) transferring said tacked fiber batt to the needle loom and tucking said tacked fiber batt into said base fabric by passing said lightly tacked fiber batt and base fabric through said main needling module of said needle loom for needling.

4,878,279

WARP TRANSFER APPARATUS

Juro Tachibana, Matsuyama, and Yoshihide Nishimura, Iyo, both of Japan, assignors to Teijin Seiki Company Limited, Osaka, Japan

Filed Jun. 8, 1988, Ser. No. 204,122
Claims priority, application Japan, Oct. 22, 1987, 62-160843
Int. Cl.[4] D03J *1/14*
U.S. Cl. 28—203 6 Claims



1. A warp transfer apparatus for transferring warp threads to a warp drawing apparatus, comprising:

a stationary frame structure,

a warp carrying frame structure for carrying the warp threads thereon which is movable with respect to said stationary frame structure and which has mounted thereon a rack extending along a direction in which said warp carrying frame structure moves,

a pinion support pivotably supported on said stationary frame structure,

a pinion rotatably supported on said pinion support and engageable with said rack,

means for driving said pinion to rotate about an axis of rotation of said pinion, the warp carrying frame structure being transferred to a predetermined position of said stationary frame by rotation of said pinion,

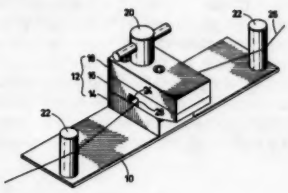
means for permitting pivotal movement of said pinion support in accordance with upward and downward movements of said rack during movement of said warp carrying frame structure, to insure that said rack is properly engaged by said pinion.

4,878,280

APPARATUS AND PROCESS FOR INTERMINGLING FILAMENT YARNS

Thomas L. Nelson, Georgetown, Del., and Lynn B. Thomas, Sr., Rhodesdale, Md., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Filed Aug. 2, 1988, Ser. No. 227,771
Int. Cl.[4] D02J *1/08*
U.S. Cl. 28—274 **8 Claims**



1. A fluid-jet apparatus for entangling yarn comprising:

(a) a block having an elongated passageway through which yarn can move, said passageway being defined by an entrance and an exit connected by at least two walls, said walls being situated substantially at right angles to one another;

(b) means for maintaining the yarn against one of said walls as said yarn enters, moves through, and exits the passageway; and

(c) an orifice in the block for directing a fluid stream into said passageway, said fluid stream discharging from the passageway through both the entrance and the exit, wherein the orifice is located in the second of said walls and is positioned so as to be offset with respect to the longitudinal axis of the passageway in the direction of the first of said walls.

5. A process for entangling yarns comprising the steps of:

(a) over-feeding yarn through a walled passageway defined by at least two walls, said walls being situated substantially at right angles to one another;

(b) directing the yarn along the first of said walls as it enters, moves through, and exits said passageway; and

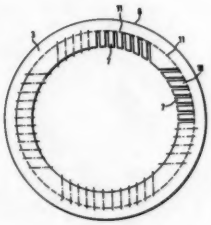
(c) exposing the yarn in the passageway to a fluid stream, said fluid stream being introduced into the passageway through the second of said walls and being offset from the center line of the yarn travel path in the direction of the first of said walls.

4,878,281

PRESS ROLL FOR DEWATERING A WEB

Hans Flämig, Hohe Str. 47, D-7920 Heidenheim; Andreas Schütte, Ligusterweg 9, D-7924 Steinheim; Christian Schiel, Albrecht-Dürer-Str. 90, D-7920 Heidenheim; Karl Steiner, Richard-Wagner-Weg 8, D-7922 Herbrechtingen, and Josef Müllner, Sebastian-Kneipp-Str. 19, D-7920 Heidenheim, all of Fed. Rep. of Germany

Filed Nov. 4, 1988, Ser. No. 267,023
Claims priority, application Fed. Rep. of Germany, Feb. 20, 1988, 3805350
Int. Cl.[4] B21B *27/00*
U.S. Cl. 29—116.1 **15 Claims**



1. A press roll for pressing webs, or the like, comprising:

a support body;

an endless, flexible, liquid tight press shell around the support body and through which the support body extends, the press shell having opposite edge zones at its lateral edges, and the press shell being longer than the support body so that the edge zones extend beyond the axial ends of the support body;

a shell support element at at least one end of the press roll and rotatably mounted on the support body; the shell support element having an axially outward side face which is axially outward of the support body;

the edge zone of the press shell at the shell support element extends axially past the shell support element and then extends radially inwardly over the axially outward side face of the shell support element; the edge zone of the press shell, where it extends radially inward, has an annular face side sealing surface pressable against the side face of the shell support element;

on the edge zone, at least partially radially inward of the annular side face sealing surface, there are a plurality of radially inwardly directed tongues which extend radially inwardly toward the axis of the press roll, and the tongues being shaped and spaced for defining a respective cutout between circumferentially neighboring tongues; on the side face if the shell support element, radially inward of the sealing surface at the edge zone, centering elements are defined which are distributed around the circumference for and placed for engaging in the cutouts between the tongues of the press shell for centering the press shell;

radially inward of the sealing surface at the side face of the shell support element and also radially inward of the centering elements, rigid holding elements are supported at the side face of the shell support element, one holding element for each tongue, and the tongue being engaged on the respective rigid holding element, which positions the tongue, holding the tongue a preset distance from the axis of the roll and the tongues being held by their respective holding elements for holding the edge zone of the press shell in place over the shell support element; and

means for clamping the edge zone of the press shell and the side face sealing surface thereof against the side face of the shell support element.

4,878,282

METHOD FOR THE PRODUCTION OF FRICTION PLATES, SYNCHRONIZING BLOCKER RINGS OR SIMILAR STRUCTURES

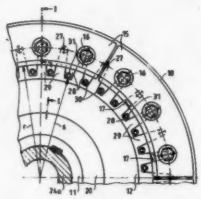
Walter Bauer, Eppelheim, Fed. Rep. of Germany, assignor to Borg-Warner Automotive GmbH, Fed. Rep. of Germany

Filed Aug. 30, 1988, Ser. No. 238,228

Claims priority, application European Pat. Off., Sep. 4, 1987, 87112963.1; Sep. 4, 1987, 87112964.9

Int. Cl.[4] B21D *53/10*

U.S. Cl. 29—149.5 C **14 Claims**



1. A method of forming friction members for use in clutches, brakes and automatic transmissions, comprising a support and a complementary friction lining, formed of an organic material having a paper base, with spaced grooves in and extending completely through the lining material to the support for the flow of oil therethrough, characterized by the steps of forming spaced grooves in the friction lining material by completely removing the lining material so the grooves extend through the material except for rims at the opposite edges thereof, said grooves each extending across the lining material between said rims, applying said friction lining material as a continuous member onto said support, and removing at least one rim to open one end of each groove.

4,878,283

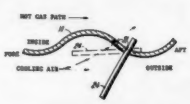
AUGMENTOR LINER CONSTRUCTION

Howard J. McLean, No. Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Aug. 31, 1987, Ser. No. 91,488

Int. Cl.[4] B23P *15/16*; F02K *3/10*

U.S. Cl. 29—163.6 **2 Claims**



1. The method of forming circular holes in a cylindrically sinusoidally shaped liner for an augmentor for a gas turbine engine that is distorted to orient the center line of the circular holes so that flow passing therethrough from a stream that is generally axial rather than radial comprising the steps of preforming from sheet metal a generally cylindrically sinusoidally shaped member, drilling a pattern of circular holes prior to the step of preforming, inserting a rod-like tool into each of said circular holes and rotating said tool to reorient the direction of said circular hole from a radial to an axial position so that the flow passing through said circular hole is tangential to the wall of said cylindrically sinusoidally shaped member through which said circular hole is made and flows in the same direction as the gas path of the gas turbine engine.

4,878,284

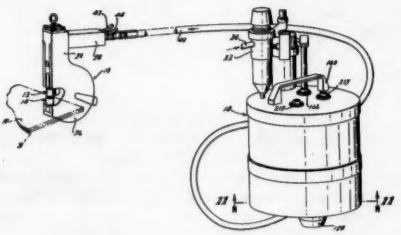
HAND HELD SHEET METAL JOINING SYSTEM

Edwin G. Sawdon, St. Clair, Mich., assignor to BTM Corporation, Marysville, Mich.

Filed Dec. 31, 1987, Ser. No. 139,976

Int. Cl.[4] B23P *11/00, 19/00*

U.S. Cl. 29—243.53 **30 Claims**



1. An apparatus for joining two or more overlapping sheets of metal, comprising: a housing; a punch and die mounted in said housing, said punch and die being aligned on a center axis and normally spaced apart a sufficient distance to receive said sheets therebetween; a piston movably mounted in said housing for driving said punch along said axis towards said die and against the sheets whereby the sheets are joined; and a cartridge releasably connected to said piston for movement therewith, said punch being carried by said cartridge.

4,878,285

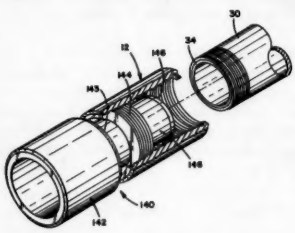
METHOD OF ASSEMBLING COUPLING TO TUBING OR CASTING

Kenneth J. Carstensen, 4540 N. 44th St., No. 70, Phoenix, Ariz. 85018

Division of Ser. No. 802,943, Nov. 27, 1985, Pat. No. 4,706,997, which is a continuation of Ser. No. 379,615, May 19, 1982, abandoned. This application Nov. 5, 1987, Ser. No. 117,682

Int. Cl.[4] B23P *11/02*

U.S. Cl. 29—451 **1 Claim**



1. The method of coupling sections of pipe for assembly into a production tubing or casing string comprising the steps of:

(a) entering a reference member from a first end of a collar, the collar being a standard A.P.I. collar having a first and second tapered internally threaded end portions, the reference member provided an interior abutment surface for

controlling the depth of penetration of a first pipe, the first pipe having tapered external threaded end portions;

(b) removing the reference member after inserting the first pipe into threaded engagement with the collar and a first end portion thereof in abutting contact with the interior abutment surface;

(c) inserting a position ring of selected length for an axial stress to be encountered along the string, within the collar with one end of the ring in abutment with the first pipe; and

(d) then engaging the second pipe into threaded engagement with the collar and an end thereof in contact with the other end of the position ring.

4,878,286

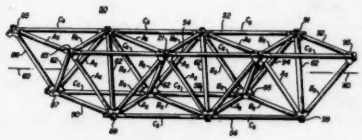
TRUSS STRUCTURE AND METHOD FOR CONSTRUCTION THEREOF

Anthony P. Coppa, Merion, Pa., assignor to General Electric Company, King of Prussia, Pa.

Division of Ser. No. 123,077, Nov. 19, 1987, Pat. No. 4,829,739, which is a division of Ser. No. 808,602, Dec. 12, 1985, Pat. No. 4,803,824. This application Sep. 2, 1988, Ser. No. 240,012

Int. Cl.[4] B23Q *3/10*; E04H *12/18*

U.S. Cl. 29—467 **10 Claims**



1. A method for constructing an elongate prism-form truss structure having a square cross section from a plurality of planar, congruent, triangular frame elements, said structure being defined by four longitudinal edges parallel to a central longitudinal axis, said longitudinal edges defining structure planes therebetween, each of said frame elements having A-, B- and C-sides located opposite A-, B- and C-vertices, the dimensions of said sides of said elements being defined by:

$$\cos \alpha = NC/4B$$

where

α=included angle between said B- and C-sides at said A-vertex,

$\alpha > 90°$,

B=length of B-side,

C=length of C-side, and

N=integer>1;

said elements being fed from four feed points radially spaced from said axis;

said method comprising the steps of:

(1) feeding said elements in a predetermined sequence from said fed points such that each element is placed into the confronting structure plane disposed between said feed point and said axis;

(2) joining each element to selected ones of the previously fed elements such that said C-sides align along said longitudinal edges; and

(3) repeating steps (1) and (2) until a structure of the desired length has been constructed.

4,878,287

PROCESS AND APPARATUS FOR POSITIONING A BALE HOOP PARTING DEVICE

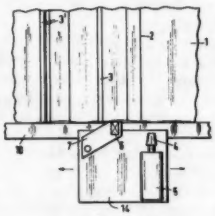
Hubert A. Hergeth, Kockerellstraße 3, 5100 Aachen, Fed. Rep. of Germany

Filed Aug. 10, 1987, Ser. No. 84,405

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1986, 3605215

Int. Cl.[4] B23P *19/04*

U.S. Cl. 29—564.3 **11 Claims**



1. An apparatus for positioning and triggering a parting device for severing hoops on bales of fiber, the apparatus comprising:

an elongated guide against which a bale of fibrous material bundled by metal hoops is pressed;

at least one sensor disposed at said guide for producing signals in response to the presence of metal;

a parting device adapted to sever a hoop and displaceable along said guide; and

a control system operatively connected to said parting device and receiving said signals from said sensor and in response to analyses of said signals, positioning and triggering said parting device to sever a hoop, the analyses of said control system including a comparison of the sensor actuation time with reference times representing hoops formed by a wire, a band and a double band, for determining the positioning and triggering of said parting device in accordance with the type of hoop to be severed.

4,878,288

PRESS

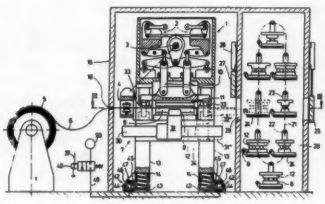
Helmut Messner, Frasnacht, Fed. Rep. of Germany, assignor to Bruderer AG, Switzerland

Continuation of Ser. No. 39,101, Apr. 16, 1987, abandoned. This application May 25, 1988, Ser. No. 203,564

Claims priority, application Switzerland, Apr. 18, 1986, 01575/86

Int. Cl.[4] B23Q *3/155*

U.S. Cl. 29—568 **18 Claims**



1. In a high-speed, high-capacity press:

means forming a support frame which stands on a base;

a first tool holder on said support frame for firmly holding a tool by first connection means;

a second tool holder on said support frame for firmly holding a counter-tool by second connection means;

said first and second tool holders defining parallel planes;

drive means for imparting relative to-and-fro movement to at least one of said tool holders, thereby transmitting vibrations to said support frame;

bearing means rigidly attached on said support frame;

a tool magazine receiving a plurality of tools and counter-tools and being arranged at a predetermined position with respect to said support frame;

handling means guided on said bearing means for handling said tools and counter-tools, comprising:

a displaceable body;

at least one gripping arm having two ends and being movably mounted for movement about perpendicular axes on said body by one of its ends, whereas the other end freely projects away from said body, including gripper means on said freely projecting end for gripping said tool holders, and

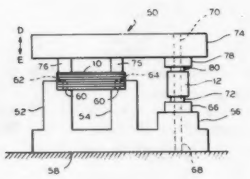
displacement drive means for said gripper arm and said body, said displacement drive means comprising lifting means to lift said gripping arm, when a tool holder is gripped, in order to raise the latter, said displacement drive means being operable to displace said handling means in a plane parallel to the planes of the holders and at right angles to their direction of movement, from a rest position to a position for transfer of said tool and counter-tool to said magazine, and between said rest position and said transfer position into at least one toolremoval position in which at least one of said tool and counter-tool is removable from the respective holder by loosening the respective means of connection.

4,878,289

METHODS OF ASSEMBLING ELECTRIC MOTORS WITH REDUCED END-PLAY

Max Lautner, Myrtle Beach, S.C.; Fred Hoffman, Chicago, and Edward Melnikov, Des Plaines, both of Ill., assignors to Uppco Inc., Chicago, Ill.

Filed Sep. 20, 1988, Ser. No. 246,364
Int. Cl.[4] H02K *15/14*
U.S. Cl. 29—596 **3 Claims**



1. A method of manufacturing electric motors, said method comprising the steps of:

(a) forming a stack of laminate plates into a stator for an electric motor;

(b) placing a shaft of a rotor/shaft assembly in parallel with a thickness dimension of said stack of laminate plates, said shaft having a compressible member mounted thereon;

(c) simultaneously closing a space between a press member, on the one hand, and said stack of laminate plates and said rotor/shaft assembly when in the parallel position of step (b), on the other hand, thereby compressing said compressible member during said closing of said space; and

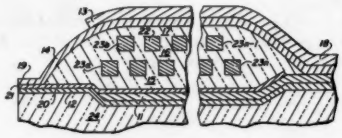
(d) using said stack of laminates as a gage for limiting the closed distance of said space, whereby the compression of said compressible member responsive to said closing is customized to compensate the overall length of said rotor/shaft in order to match the thickness of said stack of laminate plates and thereby limit the end-play of said rotor/shaft.

4,878,290

METHOD FOR MAKING THIN FILM MAGNETIC HEAD

Charles R. Masud, and Cheng-Teh Wu, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 13, 1989, Ser. No. 310,414
Int. Cl.[4] G11B *5/42*
U.S. Cl. 29—603 **9 Claims**



1. The method for making a thin film magnetic head, said thin film magnetic head being of the type comprising two layers of magnetic material forming a yoke structure, said yoke structure at one end comprising a pole tip region in which said layers of magnetic material are separated by a predetermined distance to produce a transducing gap and at another end comprising a back gap region, said yoke structure being activated by a conductor coil deposited between said one end and said another end of said yoke structure, the improvement comprising the steps of:

after the steps of forming said first layer of magnetic material, said conductor coil and electrically insulating material to insulate said conductor coil from each of said layers of magnetic material;

depositing a second layer of magnetic material which contacts said first layer of magnetic material in said back gap region and is separated from said first layer of magnetic material by a predetermined distance in said pole tip region to form a transducing gap, said second layer of magnetic material having a reduced width near said pole tip region;

depositing a masking layer over said second layer of magnetic material, said masking layer being shaped to expose a predetermined area of said second layer of magnetic material at said pole tip region;

etching said thin film magnetic head to selectively remove material in said exposed area thereby to form pole tips having a predetermined width;

removing said masking layer; and

depositing a third layer of magnetic material over substantially all of said second layer of magnetic material except said pole tip region to form a magnetic pole piece having a thinner and narrower cross-section in the pole tip region and a thicker and wider cross-section between the pole tip region and the back gap region.

4,878,291

METHOD OF MANUFACTURING TOROIDAL COILS

Kazuhiko Suguri, Kanagawa, Japan, assignor to Harada Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 4, 1987, Ser. No. 128,701
Int. Cl.[4] H01F *41/02, 27/30*
U.S. Cl. 29—606 **3 Claims**

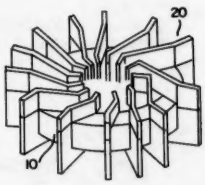
1. A method for manufacturing a pair of toroidal coils for radio frequency antennas comprising the ordered steps of:

forming first conductive members in a U-shape and second conductive members in an S-shape.

placing the bottom of each of said U-shaped first conductive members in slits formed in a jig, said slits being arranged at equal predetermined intervals in a circumferential direction on said jig;

placing a ring shaped ferrite core in said U-shaped first conductive members;

mounting said second conductive members on upper ends of said first conductive members, each of said second conductive members being electrically connected to one end



of one of said first conductive members and to the other end of another first conductive member; and

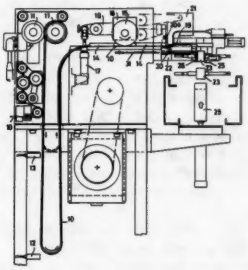
electrically fastening said second conductive members to said first conductive members.

4,878,292

ARMATURE PAPER FEEDING, CUTTING, AND INSERTING DEVICE

Luciano Santandrea, and Massimo Lombardi, both of Florence, Italy, assignors to Axis S.p.A., Florence, Italy

Filed Apr. 18, 1988, Ser. No. 182,955
Claims priority, application Italy, May 6, 1987, 67390 A/87
Int. Cl.[4] B23P *19/04*
U.S. Cl. 29—734 **11 Claims**



1. A machine for driving and variable length cutting of a paper web for use in the armature of an electric motor rotor comprising:

a variable position ledge;

a pressure drive wheel which pushes an end edge of said paper web against said ledge by means of frictional engagement of the paper, and which then slips against said paper;

means for feeding a paper web to said pressure wheel;

means for cutting said paper web between said ledge and said pressure wheel to produce a paper sheet;

means for shaping said paper sheet to fit in a slot of said rotor;

means for transferring said paper sheet to said shaping means;

means for conveying said rotor to a position suitable to receive the shaped paper sheet; and

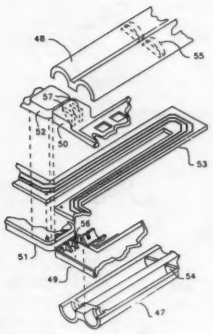
means for inserting said shaped paper sheet into said rotor slot.

4,878,293

METHOD OF INTERCONNECTING ASSEMBLIES USING TORSIONLY STRESSED CONDUCTORS ROUTED THROUGH A HOLLOW ARTICULATED HINGE

Ralph W. Kinser, Jr.; David L. Shriver, and Judith A. Layman, all of Corvallis, Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 868,401, May 29, 1986, Pat. No. 4,825,395.
This application Aug. 31, 1988, Ser. No. 238,708
Int. Cl.[4] H05K *3/02*
U.S. Cl. 29—850 **2 Claims**



1. A method of routing conductors from a first assembly to a second assembly, rotatable about the first, comprising the steps of:

hinging the first and second assemblies together with a hollow articulated hinge;

passing the conductors from the first assembly into the hollow articulated hinge through an orifice in the first assembly centered about a first axis of hinge rotation;

clamping the conductors to the first assembly in close proximity to where they exit therefrom into the hollow articulated hinge;

routing the conductors within the hollow articulated hinge along the first axis of hinge rotation for a portion of that first axis;

altering the routing of the conductors from running along the first axis to running along a second axis of hinge rotation;

routing the conductors within the hollow articulated hinge along the second axis of hinge rotation for a portion of that second axis;

clamping the conductors to the hollow articulated hinge at one end of the portion of the first axis where the step of altering the routing routes the conductors from running along the first axis and at one end of the portion of the second axis where the step of altering the routing routes the conductors to running along the second axis;

passing the conductors from the hollow articulated hinge into the second assembly through an orifice therein centered about the second axis of hinge rotation; and

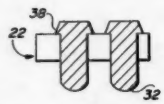
clamping the conductors to the second assembly in close proximity to where they enter therein from the hollow articulated hinge.

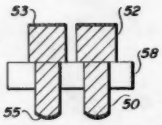
4,878,294

ELECTROFORMED CHEMICALLY MILLED PROBES FOR CHIP TESTING

William P. Dugan, Glendora, and Marvin R. Johnson, Mira Loma, both of Calif., assignors to General Dynamics Corp., Pomona Division, Pomona, Calif.

Filed Jun. 20, 1988, Ser. No. 208,907
Int. Cl.[4] H01K 3/10
U.S. Cl. 29—852 19 Claims





1. A method of fabricating microcircuit test probes having a selected configuration of circuit leads supported on a carrier with an array of probe contacts affixed to the leads, the method comprising the steps of:

applying layers of photoresist to opposite sides of a metal foil sheet to form a panel;

exposing the photoresist along a first side of the panel through first mask defining a lead pattern;

exposing the photoresist along a second side of the panel through a second mask defining a contact pattern;

developing the photoresist to form a pattern of exposed metal foil along the first side corresponding to the lead pattern image and a plurality of holes exposing metal foil along the second side of the panel corresponding to the contact pattern image;

placing the panel in an electroplating bath and electroforming contact posts in said holes and leads in said lead pattern image;

stripping the remaining photoresist from opposite sides of the panel;

applying a layer of dielectric plastic along the contact side of the panel to encase the contacts;

removing the outer portion of the dielectric plastic layer and the outer ends of the contacts to develop a substantially planar outer surface;

adding respective layers of photoresist along the outer surfaces on both sides of the panel;

exposing the added photoresist along the contact side of the panel through said second mask;

developing hole patterns in said layer of photoresist added to the contact side of the panel corresponding to said second mask;

placing said panel in an electroplating bath to further build up the contact posts in the pattern of holes in said added photoresist;

removing at least the photoresist along the lead side of the panel;

selectively etching the foil sheet to eliminate metal bridging between respective sets of leads and contacts; and

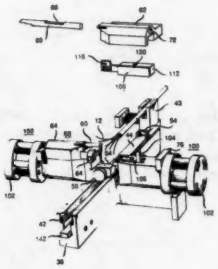
removing all remaining photoresist to leave a pattern of leads with associated contact posts extending through the layer of plastic dielectric.

4,878,295

METHOD AND APPARATUS FOR ATTACHING CONNECTORS

Michael A. Muhlberger, Hillsborough, N.J., and Willard E. Rapp, Lantana, Fla., assignors to American Telephone and Telegraph Company, New York, N.Y.

Filed Dec. 27, 1988, Ser. No. 290,551
Int. Cl.[4] H01R 43/04; B23P 19/00
U.S. Cl. 29—863 9 Claims



1. A method for successively attaching successive pairs of wires to successive pairs of opposed contacts, each contact lying along a separate one of a pair of rows on a connector, the method comprising the steps of:

placing the connector in a carriage for movement along a first axis such that each of a pair of opposed contacts is opposite a separate one of a pair of rams;

manually pulling each of a pair of wires across each of a pair of wire guides to nominally align each wire with a separate one of the contacts;

manually holding each wire in tension in its respective wire guide while simultaneously displacing each ram towards the contact opposite thereto to attach the aligned wire with the contact;

retracting each of the rams away from the corresponding contact after the wire has been attached thereto; and

simultaneously advancing the carriage along the first axis to locate each of a successive pair of contacts opposite a separate one of the rams.

4. Apparatus for attaching successive pairs of wires to successive pairs of opposed contacts, each lying along a separate one of a pair of rows on a connector, the apparatus comprising:

a base;

a connector-carrying carriage slidably mounted to the base for movement along a longitudinal axis;

a pair of rams, each slidably mounted to the base for movement to and from a separate one of a pair of opposed contacts on a connector carried by the carriage;

a pair of wire guides, each releasably mounted to the base on opposite sides of the carriage, each wire guide including a stationary catch for releasably engaging a wire, when pulled by an operator into the catch in a first orientation, and a flat surface adjacent to the catch for providing a path along which the wire can be pulled across, and tensioned by, the operator in an orientation perpendicular to the first orientation, to nominally align the wire with a separate one of the rams;

a pair of actuating means, each operatively engaged with a separate one of the rams to displace the ram towards the contact opposite thereto so the ram attaches the wire to the contact and to retract the ram from the contact after the wire is attached; and

carriage-advancing means coupled to one of the actuating means for imparting a lateral force to the carriage, only as each ram is retracted from the contact, to advance the carriage in a first direction along the longitudinal axis to pull each wire, which had been previously engaged by the

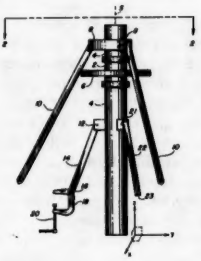
catch, to release the wire therefrom, and to align each of a successive pair of opposed contacts on the connector opposite a separate one of the rams.

4,878,296

APPARATUS AND METHOD FOR LOCATING THE AXIS OF SYMMETRY (CENTER OF CIRCULAR CROSS SECTION) OF THREE DIMENSIONAL OBJECTS

Joseph M. Londino, Jr., Mishawaka, Ind., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 22, 1988, Ser. No. 184,217
Int. Cl.[4] G01C *29/00*
U.S. Cl. 33—227 9 Claims



1. An apparatus for locating the vertical axis of symmetry of a surface having a horizontally disposed circular cross section, said axis of symmetry extending through the center of said circular cross section and being perpendicular to said circular cross section, said apparatus comprising:

plumb means for establishing a vertical line of sight, said plumb means comprising means for contacting said surface at at least three points, all of said points being located on the circular perimeter of said circular cross section; and

attaching means for mounting said apparatus, said attaching means comprising:

a first translational means for displacing said plumb means a first preselected distance, said first preselected distance having a linear projection extending along a first horizontal direction; and

a second translational means for displacing said plumb means a second preselected distance, said second preselected distance having a linear projection extending along a second horizontal direction;

each of said projections being orthogonal to one another;

and wherein said first and second translational means and said means for contacting are each adapted to cooperate with one another to permit said line of sight to be located collinear with said vertical axis of symmetry;

wherein said means for contacting comprises:

at least three extensible arms; and

a camming means for deflecting said at least three extensible arms outward from said camming means; wherein

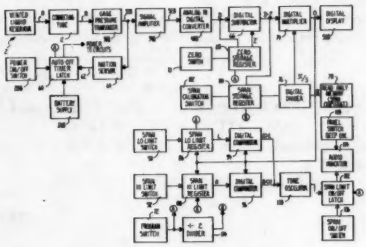
said deflecting is effective to cause said at least three extensible arms to extend outward from said camming means effective to contact said perimeter at said at least three points.

4,878,297

HYDROSTATIC LEVEL AND ELEVATION MEASURING DEVICE

Dennis L. Vories, 29142 via Piedra, Valley Center, Calif. 92082

Continuation of Ser. No. 33,467, Apr. 2, 1987, abandoned. This application Aug. 22, 1988, Ser. No. 236,328
Int. Cl.[4] G01C *5/04*
U.S. Cl. 33—366 18 Claims



1. A relative elevation indicating device comprising an hydrostatic pressure sensor module in liquid communication with a contained body of liquid under ambient atmospheric pressure through an elongated, flexible conduit, the conduit being filled with the liquid, the sensor module comprising:

(a) means for transducing hydrostatic pressure of the liquid at said sensor module to a signal which is a function of sensor module elevation relative to the elevation of the body of liquid;

(b) a means for providing a reference elevation signal which is equal to a signal produced by the transducer means when the sensor module is at a selected reference elevation;

(c) a transfer funciton means for processing the transducer signal comprising:

(1) a means for amplifying said signal, and

(2) a means for translating the amplified signal to make it relative to the reference elevation signal; and

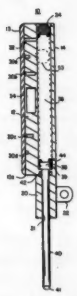
(d) means for coverting processed transducer signals to corresponding indicia readable by an operator.

4,878,298

LIQUID INDICATOR GAUGE

Royce H. Husted, 711 Lakeside Dr., Wheaton, Ill. 60187

Filed Oct. 31, 1988, Ser. No. 265,399
Int. Cl.[4] G01B *13/02*
U.S. Cl. 33—837 10 Claims



1. A measuring gauge comprising:

a generally circular body;

a spiral channel formed in said body and including an inlet at one end and a sealed reservoir at the other end;

a compressible medium in said sealed reservoir for pressurizing said other end of said channel;

said spiral channel increasing in cross sectional area from said inlet to said reservoir to provide a uniform radial scale of liquid movement in said spiral;

a chamber communicating with said inlet;

a piston movable in said chamber;

a liquid in said chamber displaceable by said piston to flow in said channel; and

a sensing device coupled to said piston for moving said piston responsive to displacement of said sensing device.

4,878,299

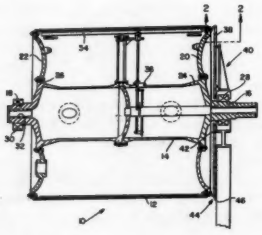
INSULATING APPARATUS FOR THERMALLY INSULATING A DRYER HEAD

Gregory L. Wedel, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Filed Jul. 10, 1987, Ser. No. 72,082

Int. Cl.[4] F26B *3/00*

U.S. Cl. 34—35 **14 Claims**



1. An insulating apparatus for thermally insulating a dryer head journalled in a dryer section of a papermaking machine, said apparatus comprising:

a stationary insulator having a disc-shaped configuration, said insulator defining a central bore for the rotatable reception therein of the journal.

4,878,300

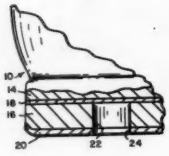
ATHLETIC SHOE

Robert D. Bogaty, Scituate, Mass., assignor to Tretorn AB, Helsingborg, Sweden

Filed Jul. 15, 1988, Ser. No. 219,414

Int. Cl.[4] A43B *21/26*

U.S. Cl. 36—35 R **18 Claims**



1. A shoe bottom for attachment to the bottom side of an upper, comprising two inner and outer midsole layers, a shock-dispersing plate layer interposed between the midsole layers at the heel end and an outersole layer disposed in engagement with the underlying one of the midsole layers, said underlying one of the midsole layers and the outsole layer containing in the area of the heel center a vertical opening, said vertical openings in the underlying one of said midsole layers and said outsole layer are overlying and expose said plate layer whereby said plate layer may deflect downwardly in the area defined by the openings.

4,878,301

SPORTS SHOE

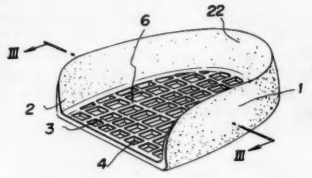
Junichi Kiyosawa, Kobe, Japan, assignor to Asics Corporation, Kobe, Japan

Filed Jun. 24, 1988, Ser. No. 211,053

Claims priority, application Japan, Jun. 25, 1987, 62-98011

Int. Cl.[4] A43B *23/08*

U.S. Cl. 36—69 **9 Claims**



1. A sports shoe comprising an upper portion, a sole portion fitted to said upper portion, and a heel counter fixed to said upper portion and said sole portion, respectively, said heel counter including a lower part nipped between said upper portion and said sole portion, and having a plurality of wall members extending generally vertically and between upper and lower surfaces of said lower part to define a plurality of spaces, said spaces opening through at least one of said upper and lower surfaces toward said upper portion or said sole portion, respectively, each of said wall members having a wall thickness less than the lateral dimension of the spaces between said wall members and a heel side wall part formed integrally with said lower part, said heel side wall part extending along the periphery of said lower part and upwardly from said lower part.

4,878,302

IDENTIFICATION TAG

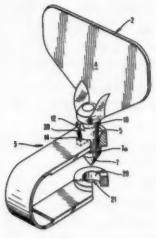
Clifford G. Jowsey, Auckand, New Zealand, assignor to ITW New Zealand Limited, New Zealand

Filed Oct. 21, 1987, Ser. No. 110,799

Claims priority, application New Zealand, Aug. 13, 1987, 221443

Int. Cl.[4] G09F *3/00*

U.S. Cl. 40—302 **7 Claims**



1. An identification tag adapted to be attached to an animal's ear by means of a manually operated tool, said tag comprising: a body portion comprising:

an elongate, downwardly extending shank including a downwardly pointed lower end and a radially projecting upwardly facing first shoulder disposed above said

pointed lower end, said shank including a radially projecting tab disposed above said first shoulder and separated therefrom by an outer periphery of said shank, a locking key projecting radially from said shank and forming an upwardly facing second shoulder, said shank including a radially projecting downwardly facing third shoulder disposed above said second shoulder and spaced therefrom, said shank having a hole extending downwardly into an upper end thereof for receiving a driving portion of the tool to enable the tool to drive said pointed lower end of said shank through an animal's ear, and

an indicia-bearing section integrally formed with said shank and extending upwardly from a location adjacent said third shoulder and spaced radially of said hole for enabling said hole to receive the driving portion of the tool, and

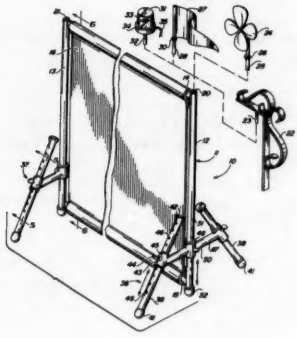
an elongate strap including first and second bores disposed adjacent opposite ends thereof, said strap being bent intermediate said opposite ends whereby said first bore constitutes an upper bore and said second bore constitutes a lower bore aligned with said upper bore, said lower bore sized to receive said pointed lower end of said shank such that a first one of said ends of said strap comes to rest against said first shoulder, said upper bore being sized to receive an upper portion of said shank and said strap including a radially extending slot opening into said upper bore for receiving said tab such that a second one of said ends of said strap is locked between said second and third shoulders and is held against rotation relative to said shank by said tab.

4,878,303

SIGN

Harry W. Banniza, 314 Ave. I, S.E., Winter Haven, Fla. 33880, and Robert D. Bowlin, 1153 Cephia St., Lake Wales, Fla. 33883

Filed Jul. 25, 1988, Ser. No. 223,947
Int. Cl.[4] G09F *15/00*
U.S. Cl. 40—606 **16 Claims**



1. A portable, changeable sign comprising:

a frame having a pair of vertical frame members and a pair of horizontal frame members attached to said vertical frame members;

display means attached to said frame between said horizontal frame members;

a pair of ground support bases attached to said frame to support said frame in an upright position for displaying said display means, each said ground support base having a pair of legs slidably connected to a support member on opposite sides thereof, whereby said legs can be adjusted for different ground levels;

attaching means for movably attaching each said ground support base to said frame to allow said frame to be raised and lowered; and

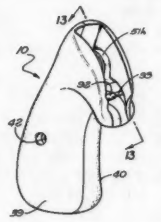
ground support means for providing additional support between said frame and a surface whereby additional support can be provided between the sign and the surface to thereby hold said sign more securely in position.

4,878,304

GUN GRIP

Carl J. Cupp, Hawaiian Gardens, Calif., assignor to Pachmayr Ltd., Monrovia, Calif.

Filed Oct. 27, 1988, Ser. No. 263,239
Int. Cl.[4] F41C *23/00*
U.S. Cl. 42—71.02 **17 Claims**



1. For use with a pistol having a handle projection, a grip comprising:

right and left grip sections to be received at opposite sides respectively of said handle projection;

at least one of said sections having two surfaces which extend generally transversely of said handle projection and which face in generally opposite directions and are positioned to engage two surfaces respectively of said projection to locate said one section relative to the projection;

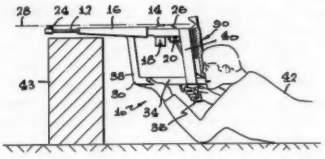
said two surfaces of said one grip section being disposed at a slight wedging angle with respect to one another to wedge tightly against said surfaces of the projection upon movement of said one section transversely of the pistol onto said handle projection.

4,878,305

HAND-CARRIED WEAPON

Pericles Gabrielidis, 14141 Riverside Dr., #1, Sherman Oaks, Calif. 91423

Continuation-in-part of Ser. No. 44,655, May 1, 1987, abandoned. This application Oct. 21, 1988, Ser. No. 260,864
Int. Cl.[4] F41C *23/00*
U.S. Cl. 42—72 **25 Claims**



1. A hand-carried weapon comprising:

a stock, a grip on said stock configured to be engaged by a shooter's trigger operating hand, a trigger on said stock positioned to be actuated by the shooter when his trigger operating hand is on said hand grip;

a barrel mounted on said stock, said barrel being positioned so that its bore is sufficiently above said stock that when the shooter engages his trigger operating hand on said grip

and his shoulder against said stock, the shooter's head is below said bore of said barrel;

at least one optical sight mounted with respect to said barrel to establish a sighting line adjacent and substantially parallel to said barrel so that when said sighting line is directed at a point, said barrel can discharge a bullet towards the point; and

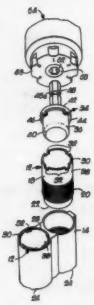
a periscope on said weapon, said periscope having first and second reflective optical elements therein, a rest surface on said periscope, said periscope having a first position in which said first reflective optical element is located so that when the shooter's face lies adjacent said stock with his forehead against said rest surface, the shooter's eye is in alignment with said first reflective optical element in said periscope and said second reflective optical element in said periscope is on said sighting line for indirect sighting, said second reflective element in said periscope being movable away from said sighting line so that the shooter can place his eye directly on the sighting line for direct sighting.

4,878,306

SHOTGUN CHOKE INSERTION AND REMOVAL TOOL

David P. Dyer, 1005 Arno Rd., Kansas City, Mo. 64113

Filed Sep. 1, 1988, Ser. No. 239,297
Int. Cl.[4] F41C *27/00*
U.S. Cl. 42—90 **11 Claims**



1. A tool assembly for facilitating the insertion or removal of an end of barrel choke of an interchangeable choke shotgun of the type wherein each choke has at least one tool engaging notch in its outer end and external threads that are adapted to be complementally threaded into internal threads therefor in the end of the gun barrel, said tool assembly comprising:

a tool body adapted to be telescoped into the normally outermost end of a selected choke to be inserted into the the gun barrel or removed therefrom and when so inserted into the choke having a first inner extremity and a second outward facing extremity,

said body having a projection thereon located to be received within a tool engaging notch in the choke when the body is inserted into said selected choke, and

an extension projecting from said second extremity of the tool body and secured to the latter so as to effect rotation thereof in either direction in response to turning of the extension; and

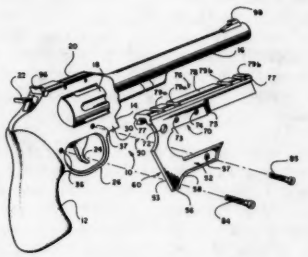
an electrically actuated, reversible drive, portable power unit connected to the extension on said tool body for selectively rotating the body in one direction to rapidly thread a choke telescoped thereover into said outer end of the shotgun barrel upon a first command to the power unit or to rapidly remove a choke from the barrel in response to a second command to the power unit by effecting rotation of the tool body in the opposite direction thereof while telescoped into the choke.

4,878,307

GUNSIGHT MOUNTING DEVICE FOR A REVOLVER

Larry F. Singletary, Thomasville, Ga., assignor to L&S Technologies, Inc., Thomasville, Ga.

Filed Apr. 22, 1988, Ser. No. 184,774
Int. Cl.[4] F41G *1/38*
U.S. Cl. 42—101 **9 Claims**



1. A gunsight mounting device for a revolver having a barrel and a side plate, the mounting device comprising:

means for receiving a gunsight, said receiving means including a first portion configured to lie closely adjacent to the side plate on a single side of the revolver, and a second portion formed integrally with said first portion and including a lower surface configured to overlie and contact a top surface of the revolver in a predetermind fixed location thereon;

means for attaching said receiving means to said single side of the revolver; and

a ledge formed integrally with said second portion of the receiving means on the side thereof opposite the first portion, said ledge resting snugly against the other side of the revolver without attachment thereto, so as to protect the mounting device from being broken off the gun by an impact from the other side,

whereby a gunsight may be mounted upon said revolver in a predetermined location relative to the barrel for use by a shooter.

4,878,308

ADJUSTABLE SHOTGUN RIB

Clyde E. Rose, South Weber, Utah, assignor to Browning Corporation, Morgan, Utah

Filed Apr. 17, 1989, Ser. No. 338,329
Int. Cl.[4] F41G *1/46*
U.S. Cl. 42—102 **16 Claims**

1. An adjustable sight rib system for a shotgun, said system comprising:

a shotgun barrel with a longitudinal axis, a muzzle end a breach end, said barrel carrying a mounting post near said muzzle end and a retaining structure near said breach end;

a rib element of approximately the same length as the barrel, said rib having an upper, approximately planar sighting surface and a lower surface oriented approximately parallel but spaced from said barrel so that said rib element has a front rib end in the proximity of said mounting post and a rear rib end in the proximity of said retaining structure;

front connection means associated with said mounting post and said front rib end, constructed and arranged such that

said front rib end can be attached to said post at selected elevations with respect to said barrel by a pivot connection; and

rear connection means associated with said retaining structure and said rear rib end can be coupled with said retaining structure to prevent longitudinal movement of said rib with respect to said longitudinal axis while permitting adjustment of the spacing of said rear rib end with respect to said barrel.

4,878,309

FISHING ROD

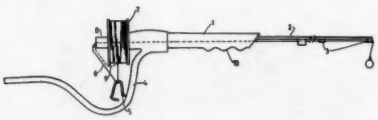
Roger M. Gough, 75 Young St., New Plymouth, New Zealand

Filed Dec. 15, 1988, Ser. No. 284,703

Claims priority, application New Zealand, Dec. 16, 1987, 222953

Int. Cl.[4] A01K *87/06*

U.S. Cl. 43—18.1 **7 Claims**



1. A fishing rod including a shaft having a reel mounted substantially para-axial therewith and a winding member rotatable about said reel to facilitate winding and unwinding of a line on said reel, characterised in that the line extends from said reel to a hook connected to the winding member and then towards the free end of said reel.

4,878,310

MAGNETIC FISHING BAIT AND METHOD

Douglas Hannon, Odessa, Fla., and Bingham A. McClellan, Traverse City, Mich., assignors to McClellan Industries, Inc., Traverse City, Mich.

Filed Oct. 5, 1987, Ser. No. 105,291

Int. Cl.[4] A01K *85/00*

U.S. Cl. 43—42.04 **20 Claims**

1. An artificial fish lure comprising a fish lure body: a fish hook made from a magnetizable material, and said fish hook being permanently magnetized sufficiently to move and hold said fish hook against said lure body;, said fish lure body being made from a material attracted by said magnetized fish hook; means movably attaching said magnetized fish hook to said fish lure body, said magnetized fish hook normally being held by the strength of its magnetism against said lure body in a position where it is less likely to snag, and said magnetized fish hook being movable away from said lure body by the strike of a fish.

4,878,311

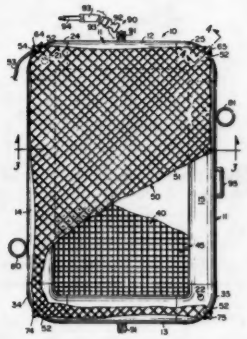
BUOYANT FISHING CONTAINER

David L. Cano, 10615 Meadowglen No. 1007, Houston, Tex. 77042

Filed Aug. 29, 1988, Ser. No. 237,801

Int. Cl.[4] A01K *97/10*

U.S. Cl. 43—54.1 **12 Claims**



1. A buoyant container adapted to float upon water and contain articles therein particularly adapted for use by a wading fisherman comprising: a generally continuous closed loop polygonal frame, means in the form of buoyant material housed within said frame for imparting buoyancy thereto, a relatively shallow basket depending from said frame adapted to contain therein sundry articles whereby said basket can be immersed in water yet remains afloat and upright due to the relatively low center of buoyancy created by said relatively shallow basket, a net of flexible material in spanning relationship to an uppermost portion of said frame for preventing articles from being accidentally or inadvertently being discharged from said basket, means for releasably securing peripherally spaced portions of said net to peripherally spaced portions of said frame and maintaining said net in spanning relationship to said frame, said frame normally being disposed in a generally horizontal plane in the in-use floating position thereof, and handle means carried by said frame for supporting said frame in another in-use carrying position in which said frame is disposed in a generally vertical plane in which said net also functions to prevent articles from being discharged accidentally or inadvertently from said basket.

4,878,312

METHOD FOR CULTURING AND CULTIVATING FUNGI

Michitaka Shimizu, Showa, Japan, assignor to Compex Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 716,375, Mar. 26, 1985, abandoned. This application Jul. 28, 1988, Ser. No. 225,647

Claims priority, application Japan, Mar. 30, 1984, 59-61037

Int. Cl.[4] A01G *1/04;* C12N *1/14;* C12Q *1/24*

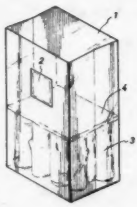
U.S. Cl. 47—1.1 **9 Claims**

1. A method for culturing and cultivating fungi, comprising the steps of:

(a) introducing at least one host wood piece having a diameter of 1 to 10 cm into a plastic bag having a porous site therein;

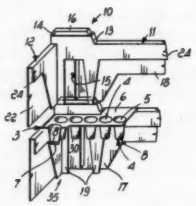
(b) placing at least one cellulose sheet to promote inoculation of the fungi and to promote the culture and cultiva-

tion of the fungi, which contains nutrients and a bactericide, on said at least one host wood piece in the bag;
(c) sterilizing the bag;



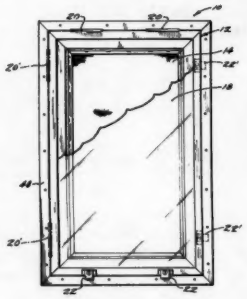
(d) inoculating the cellulose sheet with the fungi; and
(e) sealing the bag and culturing the fungi.

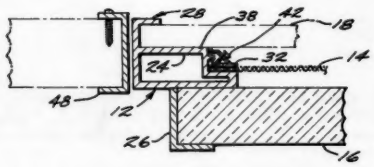
4,878,313
CONTAINER ASSEMBLY
Giampaolo Polesel, Conegliano, Italy, assignor to RESMA S.R.l., Gaiarine, Italy
Continuation of Ser. No. 895,023, Aug. 8, 1986, abandoned. This application Feb. 5, 1988, Ser. No. 154,432
Claims priority, application Italy, Aug. 9, 1985, 30783/85[U]
Int. Cl.[4] A01G *9/10*
U.S. Cl. 47—87 **12 Claims**



1. A container assembly adapted for small plants, comprising an integral box-like frame structure and a sheet-like container tray, said frame structure including:
two pairs of parallel planar lateral walls, said pairs of lateral walls being connected to define a parallelepipedal shape with four corners, each said lateral wall having upper and bottom edges, said upper and bottom edges being sapced apart from each other by a predetermined distance and respectively defining upper and bottom open surfaces,
four elevations each integrally and vertically projecting adjacent a respective corner of said lateral walls,
first engagement means formed on said elevations,
second engagement means including four downwardly extending vertical extensions projecting downwardly adjacent a respective corner, said second engagement means being vertically aligned with said first engagement means to allow engagement with said first engagement means of a second, like container assembly, said first and second engagement means being defined by cooperating male and female engagement means, and
support members extending between and interconnecting lateral walls of one of said pairs,
said sheet-like container tray comprising:
a sheet-like planar body, said body resting on said support members, said sheet-like planar body having an extension substantially equal to said upper open surface and a peripheral edge bearing on said upper edges of said lateral walls of said frame structure,
a plurality of hollow projections protruding from said planar body toward said bottom open surface and defining cells for accomodating root mediums, each of said hollow projections having a base portion with a bottom drain remote from said sheet-like planar body, the distance of said base portion from said sheet-like planar body defining a projection height which is smaller than said predetermined distance such that, when said sheet-like container tray is laid onto said frame structure, said base portions are raised with respect to said bottom open surface and define an aeration space, said peripheral edge defining corner recesses to accomodate said elevations.

4,878,314
HIGH SECURITY WINDOW
Larry A. Blockinger, 7416 Wonder La., Jacksonville, Fla. 32244
Filed Oct. 5, 1988, Ser. No. 253,752
Int. Cl.[4] E06B *5/10*
U.S. Cl. 49—381 **9 Claims**





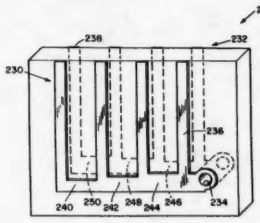
1. A security window including:
a bullet and explosion resistant exterior optically clear window pane;
a steel or titanium screen spaced from and parallel to said pane;
frame means for securing and retaining said screen and said pane; and
sash means, said frame means being pivotably mounted in said sash means.

4,878,315
GRIDING GUIDE AND METHOD
Thomas F. Dawson, Millis, and Paul C. Ewing, Tewksbury, both of Mass., assignors to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.
Continuation-in-part of Ser. No. 772,269, Sep. 3, 1985, Pat. No. 4,648,211. This application Dec. 29, 1986, Ser. No. 947,371
Int. Cl.[4] B24B *49/10*
U.S. Cl. 51—165 R **22 Claims**

1. A guide for the grinding of a surface of an object having a region to be exposed, comprising:

at least two conductive leads, each lead associated with a different face of the object; and

a conductive control track that penetrates the object for interconnecting said conductive leads and extending



across the surface to be ground which lies between said faces, at least a portion of the rear edge of said track being precisely located with respect to a predetermined grinding depth of the region so that a break in said track occurs with the grinding of the surface to that grinding depth.

4,878,316

PRESSURE CAP FOR DISPOSABLE FINISHING ARTICLE

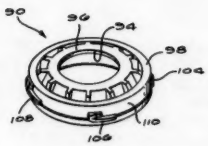
Joseph H. MacKay, Jr., 17551 Cabela Dr., San Diego, Calif. 92127

Continuation-in-part of Ser. No. 113,937, Oct. 27, 1987, Pat. No. 4,754,577, which is a continuation-in-part of Ser. No. 5,813, Jan. 21, 1987, Pat. No. 4,754,578, which is a continuation-in-part of Ser. No. 847,793, Apr. 3, 1986, Pat. No. 4,694,615. This application Apr. 15, 1988, Ser. No. 181,772

The portion of the term of this patent subsequent to Jan. 5, 2005, has been disclaimed.

Int. Cl.[4] B24B *45/00*

U.S. Cl. 51—168 **9 Claims**



1. A pressure cap for securing to a throw away finishing article used with a power tool and secured between a retainer nut and a backing flange, one of said nut and said flange having radially extending gripping means, said pressure cap comprising:

a molded plastic body defining a central opening therethrough and having an outer surface including a radially outwardly directed gripping rib for engaging said radially extending gripping means to secure said pressure cap to said article, said gripping rib including a plurality of outwardly extending tangs, each of which includes a wedge shaped portion adapted to be received by one of said radially extending gripping means, said gripping means being radially extending from said backing flange, said body further having a means for engaging a spindle of said power tool and a surface for engaging said backing flange in a load bearing relationship when attached to said power tool.

4,878,317

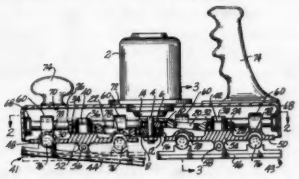
POWER SANDER

Melvin L. Ovens, 15855 - 84th Avenue, Surrey, British Columbia V3S 2N8, Canada

Filed Jul. 10, 1987, Ser. No. 72,113

Int. Cl.[4] B24B *23/04*

U.S. Cl. 51—170 TL **14 Claims**



1. A power sander comprising:

a motor;

a drive shaft extending from the motor;

first and second eccentric drive means attached to the drive shaft;

first and second reciprocable shafts driven by the first and second eccentric drive means and extending outwardly from the drive shaft in opposed directions;

first and second sander pads reciprocally mounted at the end of the first and second reciprocable shafts, said sander pads comprising an abrasive pad pivotally mounted to a support member, the pivotal mount between an abrasive pad and a support member to which the abrasive pad is mounted being substantially at the center of the support member, with cams mounted on the support member to enable variation of the orientation of the pad;

whereby rotation of the motor reciprocates the reciprocable first and second shafts to reciprocate the first and second sander pads.

4,878,318

RAILWAY TRACK MAINTENANCE MACHINE FOR THE RECTIFICATION OF THE HEAD OF THE RAIL

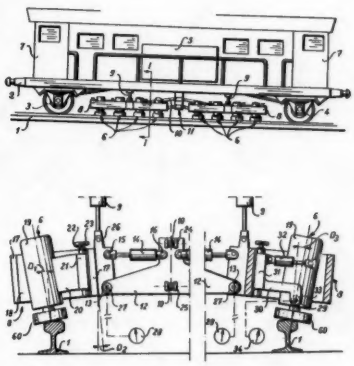
Romolo Panetti, Geneva, Switzerland, assignor to Speno International S.A., Geneva, Switzerland

Continuation of Ser. No. 214,686, Dec. 9, 1980, Pat. No. 4,843,765. This application Feb. 10, 1989, Ser. No. 308,664

Claims priority, application Switzerland, Jan. 9, 1980, 123/80

Int. Cl.[4] E01B *31/17*

U.S. Cl. 51—178 **3 Claims**



1. Railway track maintenance machine for truing the head of

railway track rails comprising a rolling frame adapted to roll on railway track rails to be trued, at least one tool carrier slipper mounted under the said frame displaceably with respect to the frame vertically and angularly in a plane perpendicular to the length of the rail, said at least one slipper carrying at least two truing units each having a rotary cutting tool, said tools having non-parallel axes of rotation as viewed in said plane; means for raising and lowering the tool carrier slipper relative to the frame which means serves also to press the slipper against the rail at the desired pressure, means for swinging the slipper in said perpendicular plane relative to the rolling frame, means to couple the truing units and the slipper such that each truing unit is individually angularly displaceable and bodily vertically adjustable relative to the slipper in a plane perpendicular to the length of the rail, and means for selectively individually bodily vertically adjusting each said truing unit in said perpendicular plane relative to the slipper.

4,878,319

MACHINE TOOL

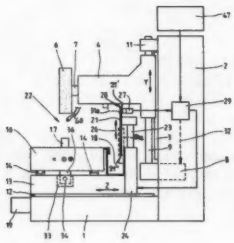
Reinhard Janutta; Franz Hartmann, both of Geesthacht, and Gerd Hinzmann, Lauenburg, all of Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany

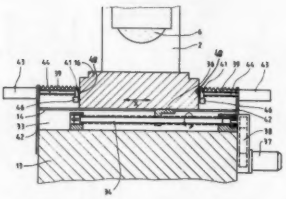
Filed Sep. 20, 1988, Ser. No. 246,984

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1987, 3733346

Int. Cl.[4] B24B *55/00*

U.S. Cl. 51—271 **14 Claims**





1. A machine tool, particularly a grinding machine, comprising a frame; guide means provided on said frame; at least one machine element movable along said guide means; at least one mobile guard for said guide means; first prime mover means for said machine element; and discrete second prime mover means for said guard.

4,878,320

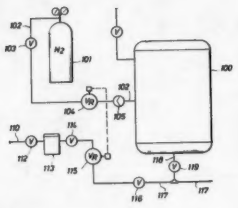
ABRASIVE FEED SYSTEM

Jerry P. Woodson, Houston, Tex., assignor to Whitemetal, Inc., Houston, Tex.

Filed Dec. 4, 1987, Ser. No. 128,589

Int. Cl.[4] B65G *53/40*

U.S. Cl. 51—320 **23 Claims**



1. Liquid-propelled abrasive cleaning apparatus comprising:

nozzle means having a body with an interior propulsion chamber having a water inlet, an air and abrasive inlet and an outlet all communicating with said interior propulsion chamber through said housing;

pump and conduit means for furnishing water under high pressure to said nozzle means;

transport line means for conveying a mixture of compressed air and sodium bicarbonate particles to said air and abrasive inlet of said propulsion chamber;

means containing a supply of sodium bicarbonate particles to be delivered under pressure to said transport line means;

nitrogen gas supply means for supplying nitrogen under pressure to said containing means to provide a pressurized flow of sodium bicarbonate particles to said transport line means;

supply means independent of said nitrogen gas supply means for supplying pressurized air to said transport line means, and

regulator means for maintaining a positive pressure differential between the interior of said containing means pressurized by said nitrogen, and said transport line means pressurized by said supply of pressurized air.

4,878,321

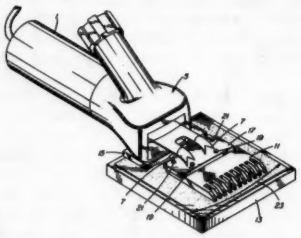
AUTOMATIC PORTABLE SHARPENING KIT FOR ELECTRIC CATTLE SHEARERS/CLIPPERS

Stanley A. Whitehead, P.O. Box 805, Kemptville, Ontario, Canada (K0G 1J0)

Filed Jul. 20, 1988, Ser. No. 221,664

Int. Cl.[4] B24D *17/00*

U.S. Cl. 51—358 **6 Claims**



1. For use in a shearer/clipper comprised of oscillating means for moving a first removable blade in a wiping motion relative to an adjacent removable stationary blade for effecting a shearing action therebetween; a sharpening kit comprised of

a flat block for connection to said shearer/clipper in place of said removable stationary blade, an abrasive surface being provided on said block, and means for connecting a selected one of either said first or stationary blades to said oscillating means whereby said oscillating means moves said selected blade in a wiping motion relative to and bearing down on said abrasive surface thereby sharpening said selected blade.

4,878,322

INSULATING PLASTIC FILM STRUCTURES AND METHOD

George Ikeda, San Francisco, and William B. Walker, Sunnyvale, both of Calif., assignors to Ikege, Inc., San Jose, Calif.

Continuation-in-part of Ser. No. 83,174, Aug. 10, 1987, abandoned. This application Aug. 5, 1988, Ser. No. 229,374

Int. Cl.[4] E04B *1/345*

U.S. Cl. 52—2 **5 Claims**

1. A walled structure comprising a skeletal frame supporting a flattened plastic film tube means for retaining gas under positive pressure, the flattened tube means comprising an inner film tube surrounded by an outer film tube axially concentric therewith, the inner and outer tubes being flattened to form a four-wall plastic film structure with adjacent ends and opposed side edges, each inner tube open end forming an air-tight seal with an adjacent outer tube open end to form a tubular sealed envelope, a flexible film retainer line passing through the inner tube adjacent each opposed side edge thereof, the skeletal frame having side and top portions and having a plurality of flexible guide strips mounted in a parallel relationship thereon, each guide strip extending along at least a portion of the frame, each guide strip comprising integral track means positioned on opposite edges of the guide strip, a guide track means on a edge of one guide strip opposing a guide track means on an opposing edge of an adjacent guide track means, the guide track means constituting means for receiving and guiding a side edge of the four-wall plastic film structure drawn therethrough by the retainer line and retaining the retainer line and four-wall plastic film structure in place on the skeletal structure.

4,878,323

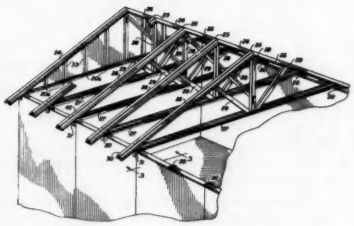
TRUSS SETTING SYSTEM

Thomas E. Nelson, 8025 Banyan Blvd., Orlando, Fla. 32819

Filed May 10, 1988, Ser. No. 192,228

Int. Cl.[4] E04C *3/11*; E04B *7/06*

U.S. Cl. 52—92 **19 Claims**



1. A system for setting trusses in building construction, comprising:

a plurality of wall panels, each having an elongated top surface;

a series of truss locks located at longitudinally spaced intervals along each of said top surfaces;

a plurality of prefabricated truss units, each having an elongated chord;

said truss locks being formed with channels and being dimensioned and configured to capture opposite ends of said chords within respective opposing ones of said channels when said panels are erected in opposing upright positions to form opposite walls of a building structure and said units are raised up to straddle said walls, so that the capturing of said chords within said channels serves to space said units; and

snap fit means for locking said ends of said chords within said channels.

4,878,324

BUILDING BLOCKS FOR BUILDING SHIELDING WALLS AGAINST RADIOACTIVE RADIATION

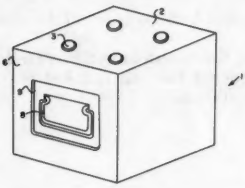
Heinz Rissel, Erlensee, Fed. Rep. of Germany, assignor to Rheinhold & Mahla GmbH, Fed. Rep. of Germany

Filed Apr. 7, 1988, Ser. No. 178,460

Claims priority, application Fed. Rep. of Germany, Aug. 19, 1987, 3727685

Int. Cl.[4] E04C *1/10*

U.S. Cl. 52—125.2 **7 Claims**



1. Building stone, for use in constructing temporary walls for shielding against nuclear radiation, in a form of a compact cube, comprising:

a cube formed by steel plates and filled with concrete, the cube having a top surface and a bottom surface (2,4) provided with bulging formations in a form of one of projections (3) and depressions (5) which engage with each other between adjacent building blocks, whereby mutual positions of the building blocks are fixed; and,

swing-out handles (8) sunk in on two mutually opposite lateral surfaces (6,7) of said cube such that the lateral surfaces are flush with an outer contour of the cube in a swung-in position of said handles.

4,878,325

TWO PIECE ADJUSTABLE, REUSABLE METAL DOOR FRAME

James E. Van Tuyl, and Clifford A. Larson, both of 8380 Pearl Rd. #102, Strongsville, Ohio 44136

Continuation of Ser. No. 947,108, Feb. 25, 1987, abandoned. This application Aug. 2, 1988, Ser. No. 228,822

Int. Cl.[4] E06B *1/04*

U.S. Cl. 52—217 **9 Claims**

1. An adjustable, variable width, reusable door frame for framing an untrimmed opening in a wall, said wall extending in a plane and separating a first region from a second region, comprising:

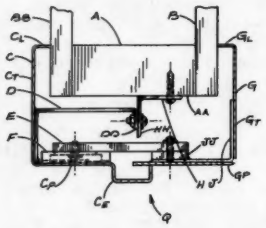
(a) a mounting bracket attached to said wall, said mounting bracket including a bracket leg extending generally parallel of said plane into said opening;

(b) a first member of generally L-shaped cross section, said first member including a first projection extending generally perpendicular of the plane of said wall, said first

projection including a door stop extension; said first member further including a mounting leg extending generally parallel of said first projection to said bracket leg, said mounting leg disposed in spaced relation of said first projection and proximate said wall;

(c) first fastening means for fastening said bracket leg and said mounting leg;

(d) a second member of generally L-shaped cross section, said second member including a second projection proximate of said wall and in overlapping relation on said first projection, said second projection interfitting between said first projection and said mounting leg, said second projection variably positionable on said first projection enabling said frame to adjust to the width of said wall; and,



(e) a joining fastener extending through said first and second projections for fastening said first projection and said second projection.

4,878,326

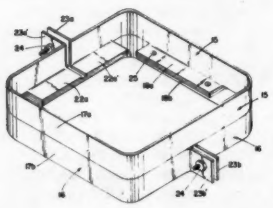
LOCKING AND SEATING MEANS FOR CHIMNEY LINERS

Thomas J. Sass, 5300 Pershing Ave., Parma, Ohio 44134

Filed Sep. 29, 1988, Ser. No. 250,559

Int. Cl.[4] E04H *12/28*

U.S. Cl. 52—218 **2 Claims**



1. A band for joining adjacent stacked liners of a chimney, said band forming a collar about the outer wall of a first liner, said band having a plurality of inwardly extending flanges at substantially right angles to the collar and abutting portions of an end surface of said liner, said band having means interlocking said band with a second band of similar form disposed about a second liner positioned in stacked end to end relation to said first liner, at least one of said inwardly extending flanges acting as said interlocking means.

4,878,327

CORROSION PROTECTED TENSION MEMBER FOR USE IN PRESTRESSED CONCRETE AND METHOD OF INSTALLING SAME

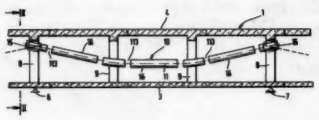
Oswald Nützel, Munich; Egbert Zimmermann, Obersaudorf, and Dieter Jungwirth, Munich, all of Fed. Rep. of Germany, assignors to Dyckerhoff & Widmann Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Mar. 14, 1988, Ser. No. 167,631

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1987, 3708067; Oct. 15, 1987, 3734954; Jan. 20, 1988, 3801451

Int. Cl.[4] E04C *3/10*

U.S. Cl. 52—230 **41 Claims**



1. Corrosion-protected tension member, such as a tendon for prestressed concrete with post-tensioning, comprising at least one axially extending steel tension element located within a tubular envelope, and with an anchoring device having an abutment member at each end thereof, said tension element has an anchor region where it is connected to said anchoring device and a free region extending between the anchor regions, said tubular envelope comprises a sheathing tube in the free region of said tension member connected in the anchor region to said anchoring device, said tubular envelope enclosing an open space around said tension element and said open space filled with a plastically deformable corrosion protection mass in the region directly adjacent to said anchoring device, wherein the improvement comprises that said tension member comprises a plurality of axially extending tension elements and each said tension element is located within a separate sheathing duct formed of a plastics material located within said sheathing tube and with a space located within said sheathing duct around said tension element and with said space within said sheathing duct filled with a plastically deformable corrosion-protection mass, said open space within said sheathing tube exteriorally of said sheathing ducts and extending between the anchor regions being filled with a hardenable material, said tubular envelope in the anchor regions comprises an anchoring tube located within an opening in the abutment member and extending from said abutment member toward the free region of the tension member and being filled with hardenable material, an anchoring pot located within said anchoring tube, said anchoring pot comprises annular side walls spaced inwardly from the anchoring tube wherein the hardenable material extends into the space therebetween and a base at its end more remote from said abutment member having a plurality of openings corresponding to the member of tension elements, and said anchoring pot being filled with a plastically deformable corrosion-resistant mass wherein the tension elements extend between and through the anchoring pots.

4,878,328

LOG-CORNERED SIDING FOR BUILDINGS

Ronald J. Berge, 11217 NE. Marx Pl., Portland, Oreg. 97220

Filed May 27, 1988, Ser. No. 199,867

Int. Cl.[4] E04B *1/10*

U.S. Cl. 52—233 **1 Claim**

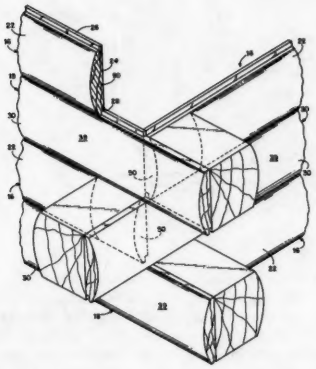
1. A modular wood siding providing the appearance of log construction comprising:

(a) a plurality of planks each having a convex outer surface and a planar inner surface;

(b) a plurality of log segments each having a convex outer surface and a planar inner surface, each of said planks having a first end portion which is integrally joined at the inner surface thereof to the inner surface of a respective

one of said log segments, and a second end portion which is not joined to one of said log segments;

(c) each log segment having an inwardly directed concave end which conforms to the convex outer surface of said planks so as to define a corner having a log segment projecting therefrom when the second end portion of one of



said planks is positioned normally against the first end portion of another one of said planks adjacent to the concave end of the log segment affixed thereto; and

(d) the second end portion of said planks include ends having straight vertical edges which abut the planar inner surface of the plank they are positioned normally against.

4,878,329

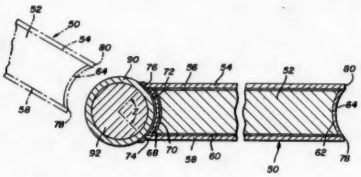
STRUCTURAL PANELS FOR WALLS, FLOORS AND ROOFS HAVING EXTERIOR METAL LAYERS AND AN INSULATING CONCRETE CORE

Rolf P. Pawski, Glen Ellyn, Ill., assignor to CBI Research Corporation, Plainfield, Ill.

Filed Jul. 15, 1988, Ser. No. 219,481

Int. Cl.[4] E04B *1/32*

U.S. Cl. 52—245 **27 Claims**



1. A structure for use as a wall, floor or roof comprising:

a plurality of panel with a pair of spaced apart elongated edges;

each panel having front and back metal layers of substantially the same shape joined to an insulating concrete core of saubstantially uniform thickness;

the panels being arranged edge-to-edge and separated by adjoining elongated metal members provided between the edges of adjacent panels;

the front and back metal layers of each panel having adjoining edges; and

means joining the adjoining edges of the front and back metal layers to the adjoining elongated metal member.

4,878,330

CONSERVATORY CONSTRUCTION

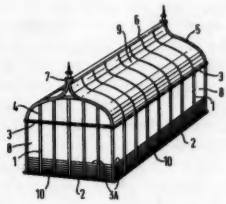
Francis Machin, South Flat, Ransome's Dock, Parkgate Road, London, SW11 4NP, England

Filed Jun. 17, 1987, Ser. No. 62,978

Claims priority, application United Kingdom, Jun. 17, 1986, 8614723

Int. Cl.[4] E06B *3/54*

U.S. Cl. 52—475 **11 Claims**



1. A conservatory or like building comprising a plurality of transparent panels mounted in a lightweight metal frame, which frame comprises side and end wall sections each comprising a plurality of vertically extending mullions uniformly spaced apart in a horizontal direction to receive and retain in weatherproof manner edges of a plurality of standard transparent wall panels, horizontal sills supporting lower ends of said mullions, a roof section having a plurality of glazing bars uniformly spaced to receive and retain, in weatherproof manner, edges of a plurality of transparent roof panels, and a horizontally extending head assembly interposed continuously between the roof section and all the wall sections characterized in that said head assembly comprises a lower head member which connects upper ends of the mullions, an upper head member surmounting and directly secured to the lower head member and a kerb section member which is secured to the top of said upper head section and to lower ends of said roof glazing bars and is provided with a kerb portion which overhangs outer faces of said upper and lower head members, all the members of said head assembly being connected together by means of interfitting grooves and projections provided on said members and so arranged as to enable the members of said head assembly to be slid transversely into fixed interlocking engagement with one another whereby all structural loads are transmitted through interlocking junctions between members of said head assembly and not through separate fixing devices.

4,878,331

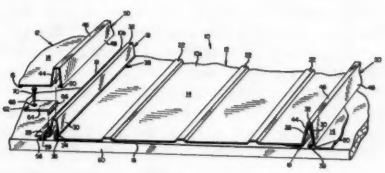
METAL ROOFING STRUCTURE

Duane F. Taylor, Salem, Oreg., assignor to Janet R. Taylor, Salem, Oreg.

Filed Jul. 28, 1987, Ser. No. 79,242

Int. Cl.[4] E04D *3/362, 3/363*

U.S. Cl. 52—519 **9 Claims**



1. In a roofing panel interlockingly joinable with longitudinally adjacent panels of substantially identical type, each panel being a rigid sheet having an upper surface, a lower surface, first and second parallel longitudinal edges, a substantially

planar primary panel portion between the edges, a large ridge which extends parallel to and between the first longitudinal edge and the primary panel portion and projects upwardly from the sheet, the ridge including an inclined ascending wall nearest the first longitudinal edge, a top wall substantially parallel to the primary panel portion, and an inclined descending wall, the large ridge defining a downwardly opening channel, and a small ridge which extends along and between the second longitudinal edge and the primary panel portion, projects upwardly from the sheet, and includes an inclined ascending wall nearest the second longitudinal edge, a top wall substantially parallel to the primary panel portion, and an inclined descending wall, the improvement wherein:

the small ridge is sized and configured to be received, without significant play and in a substantially self-aligning manner, within the channel defined by the large ridge of a longitudinally overlapping sheet;

the inclined ascending wall of the small ridge inclines at substantially the same angle as the inclined descending wall of the large ridge;

after installation, the top wall of the small ridge is sufficiently spaced below the top wall of an overlapping large ridge of a longitudinally adjacent panel to provide ventilation and to interrupt movement of water therebetween;

the upper surface of the inclined descending wall of the small ridge defines a horizontally opening channel which opens toward the primary panel portion;

the large ridge has a hook flange that extends, from the bottom of the ascending wall of the large ridge, generally horizontally into the channel defined by the large ridge;

the hook flange and horizontally opening channel are positioned, for the purpose of interlockingly joining a longitudinally adjacent panel, so that when the panels are joined the hook flange fits within the horizontally opening channel of the small ridge of the adjacent panel when the small ridge of the adjacent panel is received within the channel defined by the large ridge of the overlapping first panel and so that the hook flange is elevated above the upper surface of the adjacent panel;

the hook flange engages a portion of the wall which defines the horizontally opening channel of the adjacent panel while the inclined descending wall of the large ridge abuts the inclined ascending wall of the small ridge of the adjacent panel so that the joint between adjacent panels is formed only by interengagement of the panels, without separate fastening devices;

the hook flange and top walls are of sufficient lengths that, when the channel defined by the large ridge receives the small ridge of an adjacent longitudinally underlapping panel, the inclined ascending wall of the large ridge and the inclined descending wall of the small ridge are at least partially spaced apart so as to interrupt upward capillary movement of water and allow ventilation therebetween;

the inclined descending wall of the small ridge extends between the top wall of the small ridge and the horizontally opening channel in such a manner that the upper surface of that descending wall acts as a camming surface to guide the hook flange of an adjacent panel toward the horizontally opening channel during installation; and

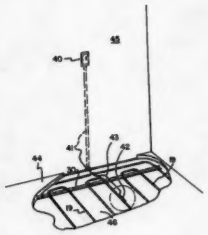
an attachment panel portion extends horizontally outwardly between the bottom of the ascending wall of the small ridge and along and between that ascending wall and the second longitudinal edge, the attachment panel portion being the only means by which the panel is attached to underlying roof support boards, attachment being accomplished by fasteners which engage the attachment panel portion and thus are positioned to be concealed when the small ridge is received in the channel defined by the large ridge of an adjacent panel.

4,878,332

ELECTRIC RADIANT FLOOR HEATING SYSTEM

Lawrence V. Drake, Buffalo, Minn., assignor to Infloor, Inc., Hamel, Minn.

Filed Jan. 11, 1988, Ser. No. 142,755
Int. Cl.[4] E04B *1/00*
U.S. Cl. 52—741 **6 Claims**



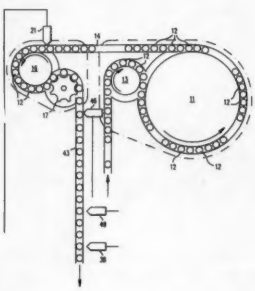
1. A method of installing an electric radiant floor heating system comprising the steps of: placing, on a subfloor, a flexible electric resistance heating cable; pouring upon the subfloor a sufficient quantity of a substantially self-leveling slurry comprises of water, calcium sulfate hemihydrate and sand to raise the electric heating cable from the floor so that it is substantially completely embedded in the slurry, and to form an underlayment layer having a thickness of about ¾ inches to about 1.5 inches; and permitting the slurry to harden while the slurry maintains said cable suspended therein, portions of the cable thereby being held essentially out of contact with the subflooring solely by the slurry and being spaced thereabove by at least about 1/16 inches.

4,878,333

FILLER LINE MONITORING SYSTEM WITH AUTOSYNCHRONIZATION

John R. Sommerfield, Los Gatos, Calif., assignor to Peco Controls Corporation, Milpitas, Calif.

Filed Jan. 20, 1988, Ser. No. 146,170
Int. Cl.[4] B65B *57/00*
U.S. Cl. 53—53 **14 Claims**



1. A monitoring and control system for a container filling line having an in-feed conveyor for conveying empty containers, a multiple-valve rotary fill station supplied by said in-feed conveyor for filling said containers, a multi-head closer station for closing the then-filled containers, a discharge station for discharging the filled and closed containers to a take-away conveyor, said take-away conveyor not being synchronized with said in-feed conveyor, the operation of said filler station and the operation of said closer station, said monitoring and control system comprising:

means at said discharge station for generating a first signal responsive to each container passing said discharge station;

a detection station provided at a location on said take-away conveyor spaced from said discharge station for detecting one or more characteristics of a container passing thereby;

means at said detection station for generating a second signal responsive to each container passing said detection station;

means for generating a first measure of the number of containers on said take-away conveyor between said discharge station and said detection station on the basis of said first signal and said second signal;

means for generating a second measure, independently of said means for generating said first measure, of the number of containers between said discharge station and said detection station;

means for comparing said first measure with said second measure; and

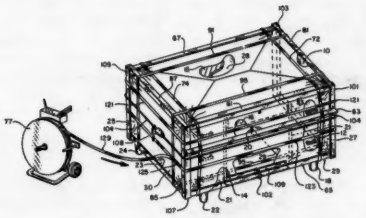
means for changing said first measure to substantially agree with said second measure if said comparison indicates said first and said second measures do not substantially agree.

4,878,334

METHOD OF PACKAGING A DESK

Daniel M. Quinn, Chino, Calif., assignor to American Wholesale Packaging, Inc., Burbank, Calif.

Filed Dec. 2, 1988, Ser. No. 279,204
Int. Cl.[4] B65B *67/00*
U.S. Cl. 53—399 **8 Claims**



1. A method for packaging a desk having top, bottom, front, back, left side, and right side, comprising the steps of:

covering the top, front, back, left side, and right side of the desk with covering means;

placing a first flexible securing means around the top, front, bottom, and rear of the desk;

placing a plurality of front and rear horizontal edge-protecting means under the securing means and onto the edges of the desk residing under the securing means;

strapping the plurality of front and rear horizontal edge-protecting means in place by strapping around the front and rear horizontal edge-protecting means and around the top, front, bottom, and rear of the desk;

placing a second flexible securing means around the left side, top, right side, and bottom of the desk;

placing a plurality of side horziontal edge-protecting means under the securing means and onto the edges of the desk residing under the securing means;

strapping the plurality of side horizontal edge-protecting means in place by strapping around the side horizontal edge-protecting means and around the left side, top, right side, and bottom of the desk;

placing a third flexible securing means around the left side, front, right side, and back of the desk;

placing a plurality of vertical edge-protecting means under the securing means and onto the edges of the desk residing under the securing means; and

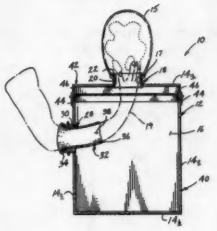
strapping the plurality of vertical edge-protecting means in place by strapping around the vertical edge-protecting means and around the left side, front, right side, and back of the desk.

4,878,335

METHODS AND APPARATUS FOR INSERTING OBJECTS WITHIN BALLOONS

Donald J. Hardy, 6806 Chateaux, Coeur d'Alene, Id. 83814

Filed Aug. 31, 1988, Ser. No. 238,842
Int. Cl.[4] B65B *43/36, 39/02, 39/06, 31/00*
U.S. Cl. 53—434 **27 Claims**



1. An apparatus for use in producing an inflated balloon having an object contained therein, the balloon having an expandable balloon mouth through which an inflated gas is injectable and the object is insertable, the apparatus comprising:

an enclosure defining an internal volume sufficiently large to receive a predetermined size object to be placed within a predetermined size balloon;

the enclosure including a balloon nozzle opening for sealingly receiving the balloon mouth, the nozzle opening having a size and shape sufficient to enable the object to pass from the enclosure through the nozzle opening and into the balloon;

injection means for filling and pressurizing the enclosure with an inflation gas to inflate the balloon about the balloon opening;

the enclosure including an access opening separate and spaced from the balloon opening, the access opening being sized for receiving a user's hand and arm therethrough; and

the access opening including access sealing means extending therefrom for, (a) fluid sealing the enclosure about the access opening when a balloon is received about the balloon opening and the enclosure filled with an inflation gas and sufficiently pressurized to inflate the balloon, and (b) enabling extension of a user's arm and hand through the access opening into the pressurized enclosure while maintaining inflation of the balloon, such that the user can handle the object to be placed in the balloon which is received within the enclosure and pass such object between the balloon opening walls and into the inflated balloon.

4,878,336

CONTROL DEVICE ON A PACKAGING MACHINE FOR SINGLE OR MULTIPLE PACKAGING OF HANGING ARTICLES OF CLOTHING

Donald Kohler, Melle, Fed. Rep. of Germany, assignor to Wilfred Pavel Maschinenbau, Fed. Rep. of Germany

Filed Mar. 14, 1988, Ser. No. 167,932
Claims priority, application Fed. Rep. of Germany, Nov. 5, 1987, 3737484
Int. Cl.[4] B65B *57/20, 65/08, 9/13, 43/12*
U.S. Cl. 53—500 **11 Claims**

1. A control device on a packaging machine for jacketing

and welding in a tubular film of plastics material articles of clothing hanging on coat hangers in single and multiple packages including:

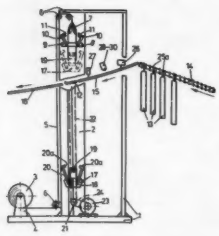
(a) a worm conveyor for conveying the hanging items of clothing to an output end thereof;

(b) downwardly inclined sliding track having an input end connected to the output end of the worm conveyor on which the hanging articles of clothing slide individually into the packaging machine;

(c) a suspension unit in the packaging machine to which the sliding track leads and into which one or more articles of clothing on their hangers slide;

(d) a clothing article unit separator associated with the sliding track at its input end;

(e) a clothing article stopping device associated with the sliding track at its output end;



(f) and a detector and controller arranged to control the unit separator so as to retain suspended articles of clothing from the worm conveyor and release them individually down the sliding track, and additionally control the clothing article stopper for retaining suspended articles of clothing on the sliding track outside the suspension unit and then release one or more articles of clothing simultaneously into the suspension unit as required;

(g) the detector acting either by virtue of magnetic detection of the last of a preset number of clothes hangers at the separator and stopper, or by means of colour scanning detection of the clothes hanger, or by means of one or more photocells arranged to detect and count the preset number of articles of clothing.

4,878,337

CONTINUOUS MOTION TRAY TYPE PACKAGING MACHINE

John L. Raudat, North Madison, and Lloyd D. Johnson, Portland, both of Conn., assignors to Standard-Knapp, Inc., Portland, Conn.

Division of Ser. No. 47,244, May 6, 1987, Pat. No. 4,793,117. This application Dec. 2, 1988, Ser. No. 278,817

Int. Cl.[4] B65B *35/44, 21/00*

U.S. Cl. 53—534 **5 Claims**

1. A continuous motion tray forming and product loading machine comprising:

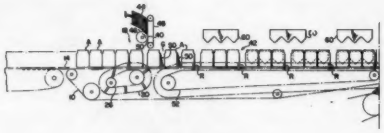
a plurality of side-by-side individual lane conveyors for advancing cylindrical articles in the downstream direction in end-to-end relationship and in side-by-side rows, each said lane conveyor including a single chain, and links of said chain carrying plates that support the articles in a horizontal plane,

first article engaging pin means for slowing the articles to create a space between adjacent rows, said individual lane conveyors continuously moving beneath the spaced rows of articles and beyond the downstream end of said article engaging pin means,

second means for engaging groups of article rows so separated by said first article engaging pin means for handling groups downstream of said spaced rows and downstream of said first article engaging pin means,

said individual lane conveyors also moving the rows of articles continuously through and at least to the downstream end of said second means,

said first article engaging pin means comprising laterally spaced pin conveyor chains, a plurality of pin supporting flights supported by said laterally spaced chains, certain of said flights having cam follower rollers, said flights being pivotably moveable of said flights relative to said chain, camming means for said cam rollers, said camming means



provided subadjacent to said horizontal plane, said camming means being movable longitudinally relative to the path of said pin conveyor chains, and adjustment means for moving said camming means to vary the angle at which said pins penetrate said horizontal plane to accommodate articles of different body diameter, and

means defining a load station and means for feeding tray blanks to the lower station from a position below said horizontal plane, and pocket defining conveyor means for moving the tray blanks and article groups out of the load station.

4,878,338

GRASS CUTTING MACHINE

Edward J. Aldred, Ipswich, and David J. Lloyd, Suffolk, both of United Kingdom, assignors to Ransomes, Sims & Jefferies PLC, United Kingdom

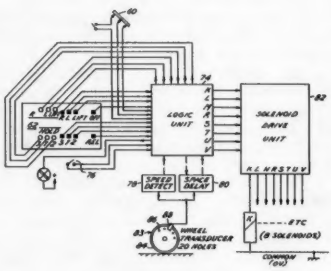
PCT No. PCT/GB87/00341, § 371 Date Jan. 19, 1988, § 102(e) Date Jan. 19, 1988, PCT Pub. No. WO87/06792, PCT Pub. Date Nov. 19, 1987

PCT Filed May 18, 1987, Ser. No. 143,850

Claims priority, application United Kingdom, May 16, 1986, 8611932

Int. Cl.[4] A01D *34/44, 34/58*

U.S. Cl. 56—7 **3 Claims**



1. A grass cutting machine comprising:

(a) spaced forward and rearward cutting units;

(b) respective unit control means connected to receive actu-

ating signals and adapted in response to said actuating signals for starting and stopping cutting operations of the cutting units;

(c) distance transducer means for providing a distance signal indicative of the distance of travel of the machine;

(d) operator actuable means for providing a common cutting start signal and a common cutting stop signal; and

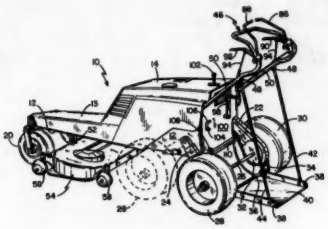
(e) common control means connected to receive said distance signal, said common cutting start signal and said common cutting stop signal and adapted on receipt of said common cutting start signal or said common cutting stop signal to provide actuating signals to said respective unit controls means, said actuating signals being spaced by a time interval computed by the common control means in response to said distance signal and the known separation of the cutting units in the direction of motion of the machine such that, irrespective of the speed of travel of the machine, the forward and rearward cutting units start cutting operations at substantially the same point on the ground and stop cutting operations at substantially the same point on the ground.

4,878,339

POWER LAWN MOWER WITH SELECTIVELY DEPLOYABLE RIDING PLATFORM

Gregory J. Marier, Brooklyn Park, Minn., and Tommy O. Moats, Frederic, Wis., assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Nov. 7, 1988, Ser. No. 268,344
Int. Cl.[4] A01D *67/04*; B62D *51/02, 51/04*
U.S. Cl. 56—14.7 **8 Claims**



1. Power lawn mowing apparatus comprising in combination:

(a) frame means having front and rear ends;

(b) an internal combustion engine supported on said frame and having an output shaft;

(c) wheel means supporting said frame means at said front end;

(d) first and second arm members pivotally secured to said frame means along opposed side edges thereof;

(e) further wheel means suspended from said first and second arm members for allowing the axis of rotation of said further wheel means to be moved forward and rearward relative to said rear end of said frame;

(f) cutting means suspended from said frame at a location between said front and rear ends of said frame;

(g) means for selectively coupling said engine output shaft in driving relation to said cutting means;

(h) means for selectively coupling said engine output shaft in driving relation to said further wheel means; and

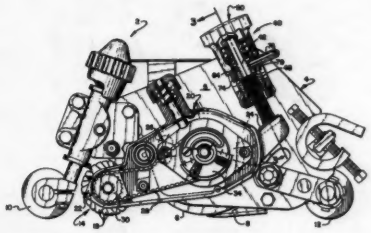
(i) riding platform means suspended from said frame proximate said rear end and movable between a first location which is non-interfering with the feet of an operator walking behind said rear end of said frame and a second location extending rearward and generally horizontally from said rear end of said frame allowing the operator to stand thereon.

4,878,340

TURF GROOMING REEL

Michael G. Roy, Mound; Helmut J. Ullrich, Eden Prairie, both of Minn.; John M. Beattie, Greeley, and Jimmie D. Sinden, Evans, both of Colo., assignors to The Toro Company, Minneapolis, Minn.

Filed Jan. 29, 1988, Ser. No. 149,772
Int. Cl.[4] A01D *34/62*
U.S. Cl. 56—249 **12 Claims**



1. An improved mower of the type having a frame supported for movement over the ground; a cutting unit carried on the frame comprising a cutting reel rotatable about a substantially horizontal axis and a bedknife cooperable with the cutting reel to sever ground growing vegetation; a rotatable grooming reel carried on the frame having a plurality of laterally spaced knife blades extending across at least a portion of the grooming reel; wherein the improvement relates to the grooming reel and comprises:

(a) at least one bellcrank support member pivotally carried on the frame having forward and rearward arms, wherein the grooming reel is rotatably journalled on the forward arm of the support member; and

(b) at least one adjustment unit for changing the vertical position of the grooming reel relative to the frame, wherein the adjustment unit comprises:

(i) an elongated rod movably supported on the frame, wherein the rod is attached to the rearward arm of the support member and extends upwardly away from the rearward arm such that movement of the rod pivots the support member on the frame to change the vertical position of the grooming reel relative to the frame;

(ii) a first selectively operable and rotatable means carried on the rod for moving the rod to effect a first adjustment in the vertical position of the grooming reel relative to the frame when the grooming reel is in an operating position closely adjacent the ground;

(iii) a second selectively operable means for raising and lowering the grooming reel between its operating position and an upper position where the grooming reel is spaced above the ground without changing the first adjustment of the grooming reel in its operating position; and

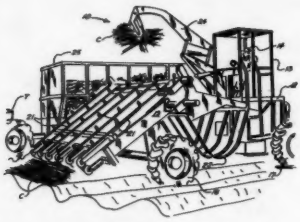
(iv) means for biasing the grooming reel upwardly from its operating position towards its upper position to help raise the grooming reel, wherein the biasing means comprises a compression spring surrounding the rod which extends between the rearward arm and a fixed abutment on the frame to be compressed when the grooming reel is in its operating position.

4,878,341

BOOM AND GRAPPLE CONFIGURATION FOR LOADING WHOLESTALK CUT SUGAR CANE AND METHOD OF OPERATION

Jacob Giardina, and Kenneth Rodrigue, both of Thibodaux, La., assignors to Cameco Industries, Inc., Thibodaux, La.

Filed Mar. 21, 1989, Ser. No. 326,535
Int. Cl.[4] A01D *91/04*
U.S. Cl. 56—364 **11 Claims**



1. A wholestalk sugar cane loader apparatus for picking up and accumulating windrowed wholestalks from a cane field ground surface having heap rows and furrows comprising:

(a) a wheeled movable carriage adapted to travel along a path defined by the carriage longitudinal center axis, generally parallel to the longitudinally extending elongated heap rows with the carriage wheels trailing in parallel furrows;

(b) means, positioned adjacent the carriage for movement therewith during gathering of windrowed wholestalk cane, for accumulating wholestalk cut cane from a resting position on the cane field ground surface into a heap;

(c) an elongated boom pivotally mounted at a rotary connection to the carriage and extending away from the rotary connection along a radial line defining a boom longitudinal axis;

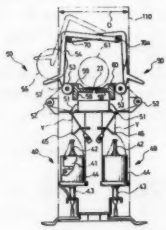
(d) a pair of opposed jaws, attached to a distal end portion of the boom opposite the rotary connection, the jaws being movable with respect to each other along a jaw travel path, the jaw travel path and the boom longitudinal axis being fixed during operation to intersect each other defining an acute angle therebetween.

4,878,342

TWO-FOR-ONE TWISTING MACHINE

Tsukasa Kawarabashi, Kyoto, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Jul. 12, 1988, Ser. No. 217,837
Claims priority, application Japan, Jul. 21, 1987, 62-181931
Int. Cl.[4] D01H *1/10, 9/02, 9/18*
U.S. Cl. 57—58.49 **10 Claims**



1. A two-for-one twisting machine having a plurality of twister units, each twister unit being associated with a respective friction roller and having a front side and a back side, the twister units being arranged in a back-to-back relationship in first and second rows, the two-for-one twisting machine comprising:

first and second support extending above the friction rollers associated with the first and second rows of said twister units, respectively, wherein the first support shaft is arranged adjacent the front side of the twister unit of the first row and is arranged toward the back side of the twister units of the second row, and wherein the second support shaft is arranged adjacent the front side of the twister units of the second row and is arranged toward the back side of the twister units of the first row, and

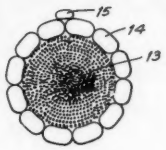
a plurality of individual cradle arms for twister units of both said first and second rows, each cradle arm associated with a respective twister unit and having a base end portion, each cradle arm being supported for pivotal motion at the base end portion thereof on the support shaft arranged toward the back side of the twister unit with which the cradle arm is associated.

4,878,343

REINFORCING ROPE MADE OF AT LEAST TWO DIFFERENT MATERIALS

Wolfgang Weidenhaupt, Erkelenz; Gunther Wepner, Waldfeucht-Neuhaaren; Peter Dismon, Heinsberg-Prose, all of Fed. Rep. of Germany, and Mattheus G. Remijn, Velp, Netherlands, assignors to AKZO BM Arnhem, The Netherlands, Arnhem, Netherlands

Division of Ser. No. 938,056, Nov. 17, 1986, Pat. No. 4,807,680, which is a continuation-in-part of Ser. No. 610,875, May 16, 1984, abandoned. This application Apr. 27, 1988, Ser. No. 186,557
Claims priority, application Fed. Rep. of Germany, May 16, 1983, 3317708; Mar. 23, 1984, 3410703
Int. Cl.[4] D02G *3/48, 3/12, 3/36;* D07B *1/06*
U.S. Cl. 57—222 **19 Claims**



1. A reinforcing rope comprising at least two components, a first component consisting of steel wires and the second component consisting of filaments of aromatic polyamides, the filaments forming a core around which the steel wires are coiled, each steel wire having a substantially rectangular cross-section defining opposite broad and narrow sides and having rounded corners, and the respective coiled steel wires being twisted along their longitudinal axes such that a broad side of each wire engages in a circumferential direction a corresponding peripheral portion of the core.

4,878,344

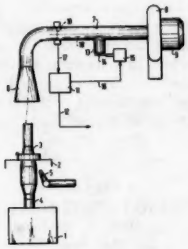
METHOD AND DEVICE FOR AUOTMATICALLY SPLICING YARN ON A RING SPINNING MACHINE

Wolfgang Igel, Ebersbach/Fils, Fed. Rep. of Germany, assignor to Zinser Textilmaschinen GmbH, Fed. Rep. of Germany

Filed Aug. 10, 1988, Ser. No. 230,801
Claims priority, application Fed. Rep. of Germany, Aug. 11, 1987, 3726720
Int. Cl.[4] D01H *13/14;* B65H *54/88, 63/032*
U.S. Cl. 57—261 **5 Claims**

1. In a method for automatically splicing yarn on a ring spinning machine wherein a broken end of yarn to be spliced is drawn by suction into a tube in position for splicing and the

presence of the yarn end in the tube in position for splicing is sensed to initiate a splicing operation, the improvement comprising reducing the amount of suction applied to the yarn end



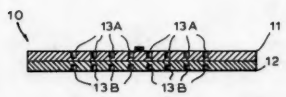
in the tube in response to said sensing of the yarn end in position for splicing to a reduced level of suction sufficient to maintain the yarn end in a non-damaging manner in the tube in position for splicing.

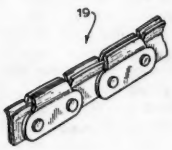
4,878,345

CHAIN ASSEMBLY AND METHOD FOR MAKING THE SAME

Stephen K. Bechtold, 306 Ocean Ave., Northport, N.Y. 11768

Filed Sep. 15, 1987, Ser. No. 96,947
Int. Cl.[4] F16G *13/06*
U.S. Cl. 59—15 **13 Claims**





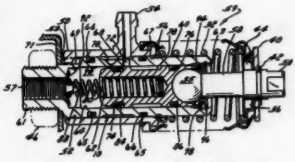
1. A method of making a chain assembly comprising:
(a) forming a plurality of links having a preselected shape and placement of apertures therein, said plurality of links being formed using a fine blanking process, during which said apertures are formed into said link, and bends are introduced into said preselected shape of each said link;
(b) forming a plurality of wire blanks with an outer diameter to permit insertion into the apertures of said links;
(c) retaining each of said links in fixed position and inserting one of said wire blanks into each aperture in said link;
(d) forming on one end of each said wire blank, a head of larger diameter than said aperture in which said blank is inserted;
(e) placing a mating link into engagement with each said link containing wirc blanks, and the and of each said blank being inserted in an aperture in said mating link in a manner to form a chain assembly; and
(f) forming a head on the other end of each said blank to complete interlocking of said links and said blanks in forming said chain assembly.

4,878,346

TAB-ALIGNED REPLACEABLE CARTRIDGE FOR MASTER CYLINDER

Glenn S. Metzelfeld, Brookfield; James A. V. Buckely, Whitefish Bay, and Donald D. Brown, Thiensville, all of Wis., assignors to Hayes Industrial Brake, Inc., Mequon, Wis.

Filed Jul. 24, 1987, Ser. No. 77,615
Int. Cl.[4] B60T *11/16*; F16J *10/04*
U.S. Cl. 60—588 **8 Claims**



1. A master cylinder comprising a housing having a longitudinal bore,
an oil inlet connected to said bore,
an outlet opening at one end of said bore, and, a tab in said bore,
an independent cartridge assembly removably mounted in said longitudinal bore and including a cylinder having a slot in a position to engage said tab to align said cylinder in said longitudinal bore, an axial bore, an oil outlet passage at one end of said axial bore, means on said one end of said cylinder for mounting said cylinder on a fixed stop, annular seal means around the outside of said cylinder to form a seal with said longitudinal bore on each side of said oil inlet,
a pair of ports in said cylinder located between said annular seal means connecting said longitudinal bore to said axial bore in said cylinder,
a piston positioned in said axial bore in a spaced relation to said oil outlet passage to define a pressure chamber in said axial bore,
seal means on the outside of said piston positioned to form a seal on each side of one of said ports to form a compensating reservoir around said piston, one of said seals closing the other of said ports on operation of said piston, and means mounted on said housing for actuating said piston to discharge fluid in said axial bore through said outlet passage, said actuating means including means for biasing said housing into engagement with said fixed stop, the assembly being so constructed and arranged that said cylinder, annular seal means, piston and piston seal means can be removed from the housing as an assembled unit.

4,878,347

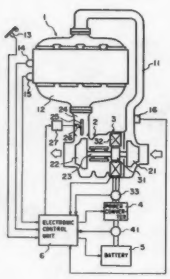
DEVICE FOR CONTROLLING TURBOCHARGER WITH ELECTRIC ROTARY MACHINE

Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed Jul. 29, 1988, Ser. No. 225,771
Claims priority, application Japan, Jul. 30, 1987, 62-191342
Int. Cl.[4] F02B *37/14*
U.S. Cl. 60—608 **4 Claims**

1. A device for controlling a turbocharger with an electric rotary machine, comprising:
a turbine mounted on an engine on a motor vehicle and drivable by exhaust gases emitted from the engine;

a rotatable shaft coupled to said turbine;
a compressor coupled to said rotatable shaft of delivering air under pressure to said engine;
an electric rotary machine coupled to said rotatable shaft;
an engine speed sensor for detecting the rotational speed of the engine;
an engine load sensor for detecting a load on the engine;
an accelerator pedal movement sensor for detecting the amount of depression of an accelerator pedal which controls operation of said engine;
a boost pressure sensor for detecting the pressure of air supplied to said engine;
a turbine speed sensor for detecting the rotational speed of said turbine;



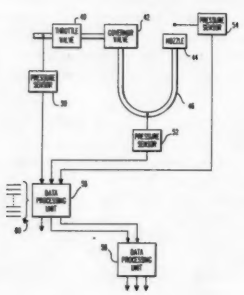
a battery mounted on said motor vehicle;
means for determining whether said electric rotary machine is in a generator mode or a motor mode based on signals from said engine speed sensor, said engine load sensor, and said accelerator pedal movement sensor;
means for calculating electric power to be supplied to said electric rotary machine based on signals from said engine load sensor, said accelerator pedal movement sensor, and said turbine speed sensor when said electric rotary machine is in the motor mode; and
means for supplying the electric power calculated by said calculating means from said battery to said electric rotary machine.

4,878,348

TURBINE GOVERNOR VALVE MONITOR

Daniel E. Fridsma, Winter Springs, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 28, 1988, Ser. No. 250,198
Int. Cl.[4] F01K *13/02*
U.S. Cl. 60—660 **8 Claims**



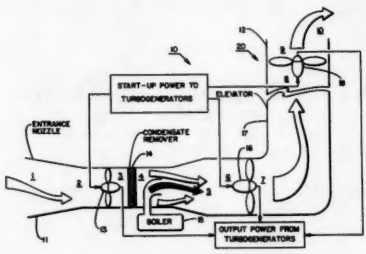
1. A method of continually monitoring the operating state of a set of governor valves in a steam supply system for the first stage of a high pressure turbine during operation of the turbine, the system including means including a throttle valve for supplying steam at a defined pressure to the governor valves and a plurality of nozzles each connected to deliver steam from a respective governor valve to a respective turbine inlet region, comprising: monitoring the pressure at the outlet of each governor valve; monitoring the pressure at the inlet to the throttle valve and at the turbine first stage; and comparing the monitored outlet pressure of each governor valve with the monitored pressure at the throttle valve inlet and at the turbine first stage in order to provide an indication of the operating state of each governor valve.

4,878,349

ATMOSPHERIC LATENT HEAT ENGINE

Julius Czaja, 229 Village Blvd. S., Baldwinsville, N.Y. 13027

Filed Dec. 13, 1988, Ser. No. 283,567
Int. Cl.[4] F02C *1/04*
U.S. Cl. 60—674 **6 Claims**



1. An atmospheric latent heat engine comprising:
a. a passageway extending between a lower and a higher elevation, said passageway having a converging nozzle entrance at said lower elevation and an exhaust exit at said higher elevation:
b. a turbo generator arranged within said passageway, said turbo generator being powered to cause a mixture of air and water vapor to flow within said passageway from said entrance to said exit, and said turbo generator being arranged to be driven by output energy from said mixture of air and water vapor flowing in said passageway;
c. a condensate remover arranged downstream of said input nozzle for removing condensate from atmospheric air expanded in said nozzle; and
d. a boiler arranged downstream of said condenstate remover for mixing warm water vapor with said air and water vapor mixture flowing in said passageway so that said mixture of air and said warm water vapor rises to said higher elevation and exhausts through said exit.

4,878,350

PULSATION DAMPENING DEVICE FOR SUPER CRITICAL FLUID EXPANSION ENGINE, HYDRAULIC ENGINE OR PUMP IN CRYOGENIC SERVICE

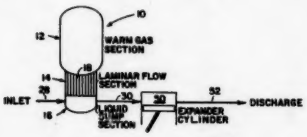
Leif A. Ness, Macungie, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Mar. 8, 1989, Ser. No. 320,346
Int. Cl.[4] F17C *7/02*
U.S. Cl. 62—50.1 **2 Claims**

1. A surge bottle or pressure pulsation dampening device for cryogenic services which comprises:
(a) a liquid sump section, wherein the liquid sump section is comprised of an enclosed area containing a volume of an incompressible fluid;
(b) a warm gas volume section, wherein the warm gas vol-

ume section is comprised of an enclosed area containing a volume of a compressible warm gas; and

(c) a laminar flow section which connects and allows for communication between the liquid sump section and the warm gas volume section, wherein the laminar flow section is comprised of a number of small bore, thin walled tubes which contain the incompressible fluid in the end connected to the liquid sump section and the compressible warm gas in the end connected to the warm gas volume



section wherein the bore of the tubes are such that any movement of the either the compressible warm gas or the incompressible fluid would be laminar flow;

whereby, during operation, the incompressible fluid and the warm compressible gas within the small bore, thin walled tubes move or oscillate a short distance in each of the tubes with minimal intermixing of the incompressible fluid and the warm compressible gas thereby minimizing heat leak from the warm gas volume section to the liquid sump section into the liquid in the sump.

4,878,351

CRYOSTAT

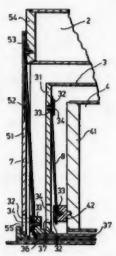
Markus Weber; Andreas Ryser, both of Dubendorf, and Rene Jeker, Hombrechtikon, all of Switzerland, assignors to Spectrospin AG, Switzerland

Filed Jul. 20, 1988, Ser. No. 222,042

Claims priority, application Fed. Rep. of Germany, Jul. 24, 1987, 3724569

Int. Cl.[4] F25B *19/00*

U.S. Cl. 62—51.1 **15 Claims**



1. Cryostat, in particular for superconductive magnets, comprising several components nested in each other, one of the said components forming an outer shell and at least another one constituting a vessel arranged inside the said shell and intended for receiving a refrigerant, and comprising further tension members for interconnecting the said components, each of the said tension members serving to suspend an inner component on the next outer neighboring component, all said tension members consisting of a fiber glass reinforced plastic material and being provided on their ends with lugs which are passed by bolts for fixing the tension members on a respective component, said tension members (7,8) being formed as strip-like unitary elements from a homogeneous plastic sheet material which is reinforced by glass fiber weave means for providing bidirectional reinforcement of said homogeneous plastic sheet material, said strip-like elements comprising an elongated central portion (21) with parallel edges, followed on both ends by enlarged areas (22) having the lugs (25) which are passed by the bolts.

4,878,352

CRYOSTAT AND ASSEMBLY METHOD THEREFOR

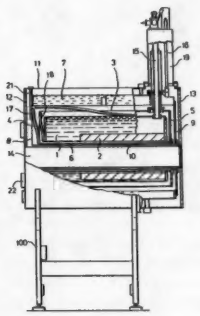
Markus Weber; Andreas Ryser, both of Dübendorf, and René Jeker, Hombrechtikon, all of Switzerland, assignors to Spectrospin AG, Zurich, Switzerland

Filed Jul. 20, 1988, Ser. No. 221,929

Claims priority, application Fed. Rep. of Germany, Jul. 24, 1987, 3724562

Int. Cl.[4] F25B *19/00*

U.S. Cl. 62—51.1 **9 Claims**



1. A cryostat suitable for superconductive magnets, said cryostat comprising:

a plurality of tubular components nested in each other said plurality of tubular components including at least one inner tank means and one outer tank means for receiving a refrigerant, a radiation shield disposed between said inner and outer tank means and jacket means for enclosing the outer tank means;

a first pipe interconnected with said inner tank means proximate one inner end thereof and projecting outwardly and through adjoining outer tubular components;

a second pipe interconnected with said outer tank means proximate one inner end thereof and projecting outwardly and through adjoining outer tubular components.,

tension member means for interconnecting said plurality of tubular components;

detachable cover means for sealing said radiation shield and said outer tank at ends thereof proximate the position of the first and second pipes;

means defining a recess in both said radiation shield and said outer tank means for enabling the first pipe to be interconnected with said inner tank when the cover means are detached, said second pipe being disposed adjacent said first pipe and in communication with the recess in said outer tank; and

tower means, joined to the jacket means, for enclosing the first and second pipes;

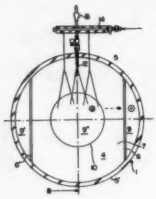
said jacket means being subdivided into a longer and a shorter section along a plane neighboring the first and the second pipe and on a side thereof opposite a side of the first and second pipes proximate said cover means, said shorter section having means defining an opening in a circumferential surface of the shorter section for enabling the first and second pipes to pass therethrough, said opening being adapted for joining with said tower means.

4,878,353

CHAMBER AND PROCESS FOR THERMAL TREATMENT COMPRISING A COOLING PHASE

Claude Gibot, Malakoff; Jean-Pierre Peyremorte, Montelimar, and Richard Sojka, Bonlieu, all of France, assignors to Carboxyque Francaise, Puteaux and Societe Nouvelle Des Etablissements J. Lagarde, Montelimar, both of, France

Filed Sep. 9, 1988, Ser. No. 244,516
Int. Cl.[4] F25D *17/02*
U.S. Cl. 62—52.1 **16 Claims**



1. A treatment chamber for cooling a charge of solid material, comprising a heat insulated cylindrical casing adapted to resist pressure, said casing having a substantially horizontal axis and first and second opposite end closures, the chamber defining a first space for receiving said charge intermediate said end closures, a transverse partition defining a second space adjacent said first end closure, said partition having an axial opening therethrough, a fan disposed in said second space for drawing gas from said first space through said opening into said second space, longitudinally extending duct means communicating between said second space and the interior of said casing adjacent said second end closure, nozzle means adjacent said partition for spraying a cryogenic fluid toward said opening, and exhaust means for exhausting from the interior of said chamber gas generated from said cryogenic fluid cooling the charge.

4,878,354

CHILLING ASSEMBLY LINE WORKPIECES BY CRYOGEN COUNTERFLOW

Thornton Stearns, Winchester, and Russell W. Blanton, Acton, both of Mass., assignors to Vacuum Barrier Corporation, Woburn, Mass.

Filed Jul. 20, 1988, Ser. No. 221,900
Int. Cl.[4] F25D *13/06*
U.S. Cl. 62—63 **25 Claims**

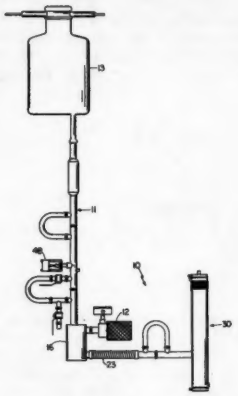
1. Apparatus for chilling workpieces with cryogenic fluid and for delivering chilled workpieces to an assembly line station, said apparatus comprising:

(a) a reservoir of liquid cryogen;

(b) a chiller comprising a passage conveying the workpieces downwardly from a location at the top of the passage to the assembly line station, the chiller comprising means for restricting the downward flow of cryogenic fluid down the passage while simultaneously allowing passage of a workpiece therethrough, the passage above the means for restricting being sized and configured to allow sufficient clearance around workpieces to permit an upward flow of cryogenic fluid;

(c) a conduit to feed cryogen fluid from the reservoir to the chiller, cryogen fluid being fed to the passage at a location between the top of the passage and the means for restricting;

(whereby cryogenic fluid which is denser than the surrounding air flows from the reservoir to the passage, and under



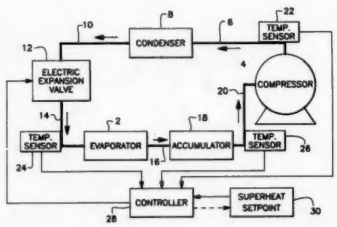
pressure, flows up the passage counter to movement of workpieces down the passage.

4,878,355

METHOD AND APPARATUS FOR IMPROVING COOLING OF A COMPRESSOR ELEMENT IN AN AIR CONDITIONING SYSTEM

Thomas J. Beckey, Edina, and Lorne W. Nelson, Bloomington, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Feb. 27, 1989, Ser. No. 315,986
Int. Cl.[4] F25B *41/00*
U.S. Cl. 62—115 **12 Claims**



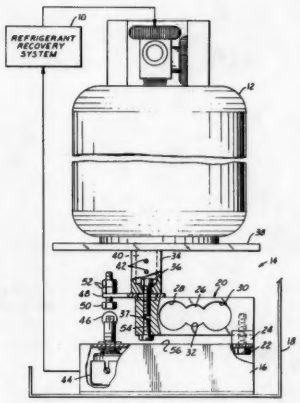
1. A method for improving the cooling of a compressor element used in an air conditioning system and having a refrigerant compressor and associated drive motor sealed in a fluid-tight shell which includes the steps of detecting an excessive increase in the temperature of the compressor element, intermittently operating the system during an occurrence of the excessive temperature with a superheat of a refrigerant in the system below zero superheat degrees to concurrently allow liquid refrigerant to enter the compressor element shell to enhance cooling of the compressor element by the latent heat of vaporization of the liquid refrigerant and terminating the intermittent operation and the admittance of the liquid refrigerant into the compressor element upon the detection of a desired temperature of operation of the compressor element.

4,878,356

STORAGE TANK SCALE FOR A REFRIGERANT RECOVERY SYSTEM

Robert J. Punches, Hamler; Gary P. Murray, Montpelier, and Roger D. Shirley, West Unity, all of Ohio, assignors to Kent-Moore Corporation, Warren, Mich.

Filed Oct. 28, 1988, Ser. No. 263,887
Int. Cl.[4] F25B *45/00*
U.S. Cl. 62—149 6 Claims



1. A refrigerant recovery system that includes a refrigerant storage container, means for withdrawing refrigerant from a refrigeration system and feeding such refrigerant to said container for storage, a scale supporting said container for supplying an electrical signal to indicate impending overfill of said container, and means for directing said electrical signal to said refrigerant-withdrawing means to terminate operation of said refrigerant-withdrawing means when said scale indicates impending overfill of said container; characterized in that said scale comprises:

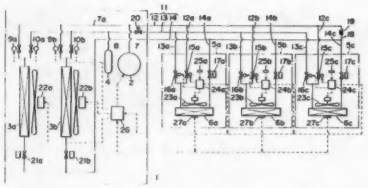
a support base, a rigid beam horizontally cantilevered from said base, means carried by said beam at an end thereof remote from said base and adapted to support said container such that weight of said container and of refrigerant contained therein deflects said beam end vertically downwardly, an electrical switch carried by said base beneath said base-remote end of said beam and having a switch actuator extending upwardly toward said base-remote end of said beam, means carried by said beam spaced from said actuator in the absence of deflection of said beam for engaging said switch actuator upon a set amount of deflection of said base-remote end of said beam toward said switch actuator, and means on said beam spaced from said support base in the absence of deflection of said beam forming a stop for abutting engagement between said beam and said base to limit deflection of said beam toward said switch actuator and thereby protect said switch and actuator from damage due to excessive weight on said base-remote end of said beam.

4,878,357

AIR-CONDITIONING APPARATUS

Kunie Sekigami, Ota; Kouji Nagae, and Yoji Sasaki, both of Oizumi, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Dec. 21, 1988, Ser. No. 287,086
Claims priority, application Japan, Dec. 21, 1987, 62-324493; Mar. 29, 1988, 63-75733; Sep. 20, 1988, 63-235806
Int. Cl.[4] F25B *13/00*
U.S. Cl. 62—160 4 Claims



1. An air conditioning apparatus comprising: an outdoor side unit having a compressor, and an outdoor heat exchanger placed in contact with outside air or water, a plurality of room units having a indoor heat exchanger placed in contact with indoor air for selectively providing heating or cooling, wherein a high-pressure gas pipe, connected at one end thereof to said compressor, has high-side branch pipes, low-pressure gas pipe being connected at one end thereof to said compressor and having low-side branch pipes, at least one said high-side branch pipes and at least one of said low-side branch pipes being connected to one end of said outdoor heat exchanger via an outside valve for changing refrigerant flow, another portion of said high-side branch pipes having auxiliary high-side pipes, another portion of said low-side branch pipes having auxiliary low-side pipes, said auxiliary high-side pipes and said auxiliary low-side pipes being connected to one end of said indoor heat exchangers via an inside valve for changing refrigerant flow, a liquid pipe being connected to the other end of said outdoor heat exchanger and having liquid branch pipes, said liquid branch pipes connected to the other ends of said indoor heat exchangers via expansion devices, and wherein said other portion of said high-side branch pipe, at least a part of each of said auxiliary high-side pipes, said other portion of said low-side branch pipe, at least a part of each of said auxiliary low-side pipes, a part of said liquid pipe and at least a part of each of said liquid branch pipes are disposed between said outdoor side unit and said room units.

4,878,358

DEMISTING CONTROL SYSTEM OF AIR CONDITIONER FOR AUTOMOTIVE VEHICLES

Kazuo Fujii, Konan, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Jun. 29, 1988, Ser. No. 213,165
Claims priority, application Japan, Dec. 1, 1987, 62-305375
Int. Cl.[4] F25B *1/00*
U.S. Cl. 62—227 6 Claims

1. A demisting control system of an air conditioner for an automotive vehicle, said air conditioner including an evaporator, and a variable capacity compressor capable of being controlled in capacity by an external signal, said demisting control system comprising:

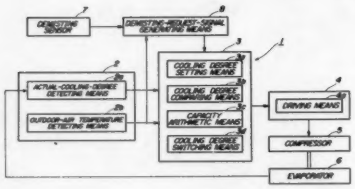
detecting means for detecting an actual cooling degree of said evaporator;

setting means for setting at least two desired cooling degrees of said evaporator;

comparing means for comparing the actual cooling degree detected by said detecting means with each of said at least two desired cooling degrees set by said setting means, to output comparison results;

determining means for determining a value of capacity to which said compressor is to be controlled, on the basis of the comparison results from said comparing means;

capacity switching means for selecting one by one said at least two desired cooling degrees in predetermined sequence and supplying each of the selected cooling degrees



to said comparing means for a predetermined time period exclusively provided for the each selected cooling degree; and

driving means for driving said compressor by said external signal so that the capacity thereof is brought to said value of capacity determined by said determined means.

4,878,359

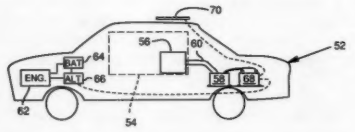
TRAVEL ACCESSORY

Gerald D. Mandell, 1111 Strawberry La., Ashland, Oreg. 97520

Filed Oct. 5, 1988, Ser. No. 254,372

Int. Cl.[4] B60H *1/32*

U.S. Cl. 62—239 **13 Claims**



7. An apparatus for travelling with a pet, comprising:

a vehicle, said vehicle including a passenger compartment, an engine, a first battery for starting the engine and an alternator for charging the first battery;

a power source distinct from said first battery;

an active cooling system powered from said power source; and

an enclosure adapted for holding a pet, said enclosure being cooled by the cooling system and including means for introducing fresh air into the enclosure from the outside thereof.

4,878,360

AIR DELIVERY SYSTEM FOR A TRANSPORT REFRIGERATION UNIT

Herman H. Viegas, Bloomington, Minn., assignor to Thermo King Corporation, Minneapolis, Minn.

Filed Nov. 14, 1988, Ser. No. 270,861

Int. Cl.[4] B60H *1/32*

U.S. Cl. 62—239 **5 Claims**

1. An air delivery system for a transport refrigeration unit having a prime mover, a condenser, an evaporator, and condenser and evaporator air delivery means, comprising:

a first shaft driven by the prime mover,

first and second pulleys fixed to said first shaft having fixed and variable pitch diameters, respectively,

a second shaft spaced from said first shaft,

a third pulley journaled for rotation on said second shaft,

said third pulley driving the condenser air delivery means,

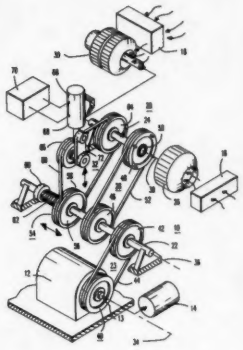
a fourth pulley fixed to said second shaft,

said fourth pulley driving the evaporator air delivery means,

an idler pulley,

actuator means for selectively adjusting the position of said idler pulley,

first belt means linking said first and third pulleys to drive the condenser air delivery means at a speed directly proportional to the speed of the prime mover,



and second belt means linking said second, fourth and idler pulleys,

said actuator means adjusting the position of said idler pulley to select pitch diameters of said second pulley which provide speeds for the evaporator air delivery means which may be varied relative to the speed of the prime mover.

4,878,361

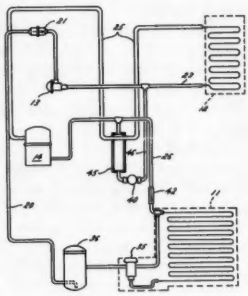
HARVEST CYCLE REFRIGERANT CONTROL SYSTEM

Vance L. Kohl, and Charles E. Schlosser, both of Manitowoc, Wis., assignors to The Manitowoc Company, Manitowoc, Wis.

Filed Sep. 30, 1988, Ser. No. 251,803

Int. Cl.[4] F25C *5/10*

U.S. Cl. 62—352 **14 Claims**



11. In an ice making system having a compressor, a condenser and an evaporator and having both a freeze cycle wherein a refrigerant is circulated from the compressor to the condenser through a discharge line and thereafter circulated to the evaporator and returned to the compressor through a supply line and a harvest cycle wherein a refrigerant is circulated from he compressor to the evaporator through the discharge line and thereafter returned to the compressor through the supply line a normally closed hot gas valve disposed between the compressor and the evaporator, said hot gas valve

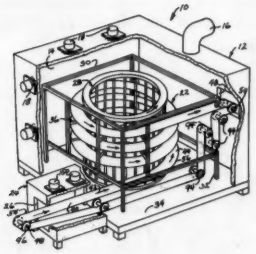
being open during the harvest cycle to permit the flow of vaporous refrigerant therethrough, a check valve disposed between the condenser and the compressor, said check valve preventing the backflow of refrigerant from the condenser to the evaporator during the harvest cycle, a reservoir disposed between the compressor and the evaporator and communicating with the discharge line, means for condensing refrigerant in the reservoir during the freeze cycle, said means for condensing refrigerant comprising a portion of the supply line which is cool during the freeze cycle and which is in thermal contact with a portion of the reservoir, and means for expelling the condensed refrigerant from the reservoir to augment the amount of vaporous refrigerant circulating between the compressor and the evaporator during the harvest cycle.

4,878,362

CHILLER WITH EXPANDING SPIRAL CONVEYOR BELT

Lewis Tyree, Jr., Lexington, Va., assignor to Liquid Carbonic Corporation, Chicago, Ill.

Filed Jun. 27, 1988, Ser. No. 211,985
Int. Cl.[4] F25D *25/02*
U.S. Cl. 62—381 **12 Claims**



1. A chiller comprising an insulated enclosure for maintaining temperatures below ambient temperatures therewithin,
means forming an entrance and an exit in said enclosure,
an endless conveyor belt for carrying products from said entrance to said exit throughout said enclosure,
means for driving said conveyor belt so that said endless conveyor belt follows along an initial straight-line path section and then along a helical path section which helical path constitutes a significant portion of said belt's total pathway, and
cooling means for establishing a temperature within said enclosure sufficiently low to satisfactorily remove heat from products carried along said conveyor,
said belt being constructed so that, in changing its orientation during the transition from said straight-line path section to said helical path section, only longitudinal expansion of appropriate regions of said belt occurs.

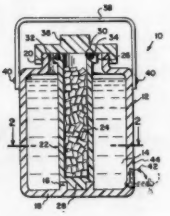
4,878,363

SUPER KOOLER

Francis E. Wells, Sr., 7823 Mandan Rd., Greenbelt, Md. 20770, and George Spector, 233 Broadway RM 3815, New York, N.Y. 10007

Filed Feb. 15, 1989, Ser. No. 311,034
Int. Cl.[4] B67D *5/62*
U.S. Cl. 62—400 **3 Claims**

1. A cooler device, comprising:
(a) an outer housing for holding a beverage, said outer housing having a central sleeve with a seat formed into center of bottom wall and an externally threaded neck formed in top end thereof;
(b) an inner container for holding ice, said inner container having an externally threaded mouth end and a base end and can be inserted within said sleeve of said outer housing so that said base end will fit into said seat;
(c) an inner internally threaded cap engageable with said externally threaded mouth end for sealing said inner container; and



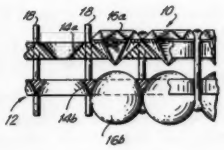
(d) an outer internally threaded cap engageable with said externally threaded neck and will bear against said inner cap for sealing said outer housing and holding said inner container within said central sleeve thereby preventing the beverage from becoming diluted when the ice melts.

4,878,364

DOUBLE FACED JEWELRY SETTING

Joseph A. Freilich, Jericho, N.Y., assignor to M. Fabrikant & Sons, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 72,664, Jul. 13, 1987, abandoned. This application May 19, 1988, Ser. No. 198,592
Int. Cl.[4] A44C *27/00, 17/02*
U.S. Cl. 63—28 **16 Claims**



1. A double faced jewelry setting comprising:
a base having first and second opposite sides;
securing means for securing a plurality of first gemstones on said first side in at least a substantially abutting relation and for securing a plurality of second gemstones on said second side in at least a substantially abutting relation, wherein different gemstones can be retained and displayed on the first and second opposite sides,
said base including a first base section for holding said plurality of first gemstones and a second base section for holding said plurality of second gemstones, said first and second base sections being substantially parallel to each other in a spaced apart relation,
said first base section including a plurality of first bores for holding said plurality of first gemstones and said second base section including a plurality of second bores for holding said plurality of second gemstones,
wherein said first and second bores are in alignment with each other.

4,878,365

APPARATUS FOR CONTINUOUS TREATMENT OF A TEXTILE WEB

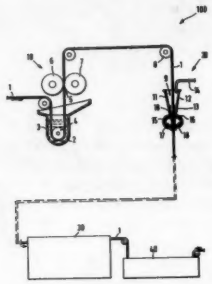
Johannes Kutz, Tönisvorst, and Günter von Harten, Kaarst, both of Fed. Rep. of Germany, assignors to Eduard Küsters Maschinenfabrik GmbH & Co. KG, Krefeld, Fed. Rep. of Germany

Filed Oct. 11, 1988, Ser. No. 255,611

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1987, 3733997

Int. Cl.[4] D06B *3/18, 21/00*

U.S. Cl. 68—9 8 Claims



1. An apparatus for the continuous treatment of web of material wherein two applicators containing treatment baths are serially arranged in the running direction of the web such that after the web absorbs treatment bath from the first applicator the web is still wet as it passes into the second applicator, said apparatus comprising:

(a) a first applicator applying a first treatment bath to the web;

(b) a roll squeezing mechanism through which the web is fed after passing through the first applicator;

(c) a second applicator applying a second treatment bath to the web after it passes through the roll squeezing mechanism, with both sides of the web being in contact with only a very small amount of the second treatment bath, which is continually being replenished in proportion to the rate it is absorbed by the web;

(d) a gap extending across the width of the web through which the web is conducted after passing through the second applicator; and

(e) a wiping device defining said gap comprising a flexible wall disposed on at least one side of the web in a zone extending across the width of the web, said flexible wall being inflatable by a fluid pressure medium to sealing abut against the web.

4,878,366

LOCKING DEVICE FOR A VEHICLE WHEEL AND TIRE

Robert W. Cox, 5634 Foxcross Pl. SE., Stuart, Fla. 34997

Filed Oct. 27, 1988, Ser. No. 263,549

Int. Cl.[4] E05B *73/00*; B60R *25/00*

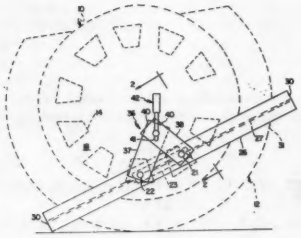
U.S. Cl. 70—14 6 Claims

1. A locking device for preventing rotation of a vehicle supporting wheel having a tire mounted thereon, said device comprising:

a clamp including a pair of clamp members and a base portion connecting the clamp members at one end, said clamp members extending from the base portion in spaced apart relation and having threaded free ends adapted to be inserted through openings between the inner and outer sides of a vehicle wheel whereby said base portion is engageable with one of the wheel sides and said clamp members project outwardly of the other wheel side;

a wheel rotation blocking bar mountable on the free ends of said clamp members in chordal relation to the vehicle wheel and tire, said blocking bar having a length such that at least one end thereof extends beyond the outer circumference of the tire;

fastener means engageable with said clamp members for



urging said blocking bar into frictional compressive contact with one side of the tire at two chordally spaced locations thereon; and

locking means detachably engageable with said clamp members for preventing the removal of said fastener means therefrom.

4,878,367

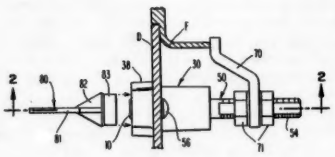
BINARY CODED KEY AND LATCH-ACTUATOR

Robert H. Bisbing, Springfield, Pa., assignor to Southco, Inc., Concordville, Pa.

Filed Mar. 22, 1985, Ser. No. 715,077

Int. Cl.[4] E05B *27/08*

U.S. Cl. 70—491 5 Claims



1. In combination a binary-coded key and mating latch actuator comprising:

(a) a key having a tubular stem forming an internal bore, said stem having radial recesses in its inner circumferential wall of a preselected number and at preselected locations;

(b) a rotatable latch actuator having a stud portion having radial projections therefrom the size and location of said projections corresponding to the recesses in the inner wall of said stem to permit said stud portion to be received within the bore of said tubular stem of said key;

(c) wherein the surface of the inner circumferential wall of said tubular key is considered to be divided circumferentially into a predetermined number of equal divisions, each division corresponding to a "0" or a "1" in the binary code according to whether said division is recessed or non-recessed; and

(d) wherein the number and locations of the recesses in the key stem are fixed in accordance with said binary code.

4,878,368

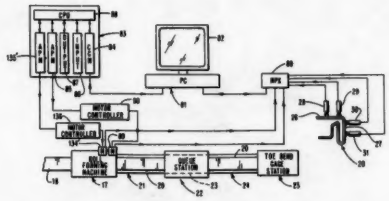
ADAPTIVE ROLL FORMED SYSTEM AND METHOD

Roy T. Toutant; David S. Perry, both of Louisville; Michael A. Brennan, Prospect; James E. Kreko, and Mark A. Dilk, both of Louisville, all of Ky., assignors to General Electric Company, Louisville, Ky.

Filed Dec. 4, 1987, Ser. No. 129,007

Int. Cl.[4] B21D *5/08*

U.S. Cl. 72—9 **20 Claims**



1. A system for maintaining a first surface of each of a plurality of roll formed parts relative to a second surface of the same roll formed part within a predetermined relation including:

roll forming means for forming first and second surfaces of each of a plurality of roll formed parts relative to each other;

measuring means for measuring the relation between the first and second surfaces of each of the roll formed parts after said roll forming means has completed formation of the relation between the first and second surfaces of each of the roll formed parts;

first determining means for determining whether the measured relation is within the predetermined relation;

second determining means for determining if the measured relation of each of a selected number of consecutive roll formed parts is not within the predetermined relation as determined by said first determining means;

and adjusting means for adjusting said roll forming means in accordance with the relationship of the measured relation to the predetermined relation only if said second determining means has determined that the measured relation of each of the selected number of consecutive roll formed parts is not within the predetermined relation as determined by said first determining means.

4,878,369

APPARATUS FOR FORMING ELONGATE STRUCTURAL COMPONENTS

Howard R. Apps; Adrian D. Lucas, both of Woodford, and Philip C. Fairhall, North Cheam, all of United Kingdom, assignors to British Aerospace Public Limited Company, London, England

Filed Sep. 9, 1987, Ser. No. 94,749

Claims priority, application United Kingdom, Sep. 9, 1986, 8621725

Int. Cl.[4] B21D *11/14*

U.S. Cl. 72—12 **21 Claims**

1. Apparatus for forming an elongate structural workpiece having a length and a longitudinal axis, such as for example a stringer, to have a predetermined contour, said apparatus comprising:

base means;

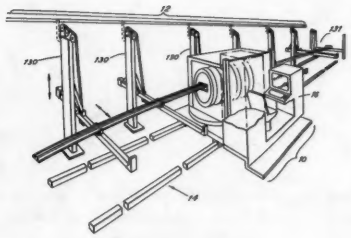
two longitudinally spaced frame means, each provided on said base means and at least one of said two longitudinally spaced frame means being mounted for pivotal movement with respect to said base means about a respective first pivotal axis;

each frame means including two longitudinally spaced manipulator heads, each of said heads mounted for at least pivotal movement with respect to the associated frame means about respective substantially parallel second pivotal axes substantially parallel with said first pivotal axis;

each of said manipulator heads including means for engaging said workpiece by a clamp in a load transfer relationship;

contour and load sensing means, associated with at least one of said manipulator heads, for providing contour data representative of the contour of a portion of said workpiece adjacent said manipulator heads and load data representative of the loads applied to said workpiece by said manipulator heads;

first actuator means for effecting relative movement of said frame means, for causing movement of at least two of said manipulator heads, and for applying a controlled bending moment in a predetermined plane to at least part of said



portion of said workpiece adjacent said manipulator heads;

second actuator means for effecting relative movement of at least two of said manipulator heads and for applying a controlled torque to at least part of said portion of said workpiece adjacent said manipulator heads; and

control means including store means for storing data representing said predetermined contour, said contol means further including means responsive to said contour data and the load data from said sensor means, for determining required permanent set deflections to be applied to said portion of said workpiece adjacent said manipulator heads and for controlling said first and second actuator means to apply said required permanent set deflections to said workpiece.

4,878,370

COLD EXTRUSION PROCESS FOR INTERNAL HELICAL GEAR TEETH

William J. Fuhrman, Bloomfield Hills; Daniel W. Hall, Plymouth, and John C. Schneider, Detroit, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Aug. 15, 1988, Ser. No. 232,042

Int. Cl.[4] B21C *25/06*

U.S. Cl. 72—264 **6 Claims**

1. A process for cold extruding internal ring gear teeth comprising the steps of machining an annular ring gear blank with precision inside and outside diameters;

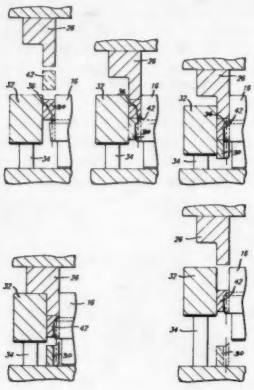
mounting said gear blank over a mandrel arranged coaxially with respect to said blank, said mandrel having external die teeth with metal forming portions and a relief portion of pitch diameter and tooth thickness less than the corresponding dimensions of the metal forming portions;

mounting a die ring around said mandrel and blank, said die ring having an inside diameter equal to the desired outside diameter of the finished ring gear;

moving an annular punch between said die ring and said mandrel whereby said workpiece is extruded partially through said die teeth;

mounting a subsequent workpiece over said mandrel adjacent the aforesaid workpiece in abutting relationship with respect to the latter;

and moving said die ring in unison with the workpiece being extruded thereby reducing the total extrusion force required and eliminating the possibility of scoring of the workpiece and die ring at the surface-to-surface interface.

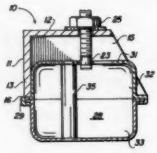


4,878,371

REALIGNMENT TOOL FOR APERTURE MATING SURFACE

Robert W. Hull, 2915 E. Mulberry, Phoenix, Ariz. 85040

Filed Dec. 31, 1984, Ser. No. 687,779
Int. Cl.[4] B21D *9/05*
U.S. Cl. 72—390 **5 Claims**



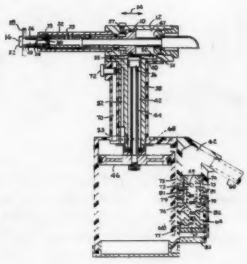
1. A tool for realigning a warped aperture mating surface upon a mid-flanged oil sump to facilitate its external attachment to a jet aircraft engine, said tool comprising: a yoke member having a top plate defining a first plane and having an aperture defined therethrough, a back plate and a first and second side plate, said back plate and said side plates being secured to said top plate in generally normal relationship thereto and depending therefrom to define a flange engaging surface for engaging the mid flange of said sump in a second plane disposed in generally parallel spaced relationship to said first plane, said back plate being operatively interposed between said side plates in supporting relationship thereto; an aperture engaging means having a cylindrical body portion threaded at one end thereof and having a notch defined therein to define a crescent supporting surface therewith adjacent the other end thereof for engagement with the warped aperture in said mating surface in a third plane intermediate said first plane and said second plane; and force means operatively associated with said aperture engaging means and actuatable upon said threaded body portion to selectively move said crescent supporting surface and hence said warped aperture mating surface engaged therewith toward and away from said top plate in response thereto until said third plane is placed in substantially parallel planar relationship to said first and said second planes.

4,878,372

SHOCK-ABSORBING FLUID-ACTUATED FASTENER INSTALLATION TOOL

Gary L. Port, Woodstock, and John J. Kaelin, Saugerties, both of N.Y., assignors to Huck Manufacturing Company, Irvine, Calif.

Filed Dec. 16, 1988, Ser. No. 285,469
Int. Cl.[4] B21J *15/34*
U.S. Cl. 72—391 **11 Claims**



1. A push-pull tool for setting fasteners comprising:
a tool actuator cylinder;
a fastener actuator piston slidably positioned in the actuator cylinder to subdivide the cylinder into first and second chambers;
first and second separate fluids; said first fluid being a liquid; said second fluid including a liquid;
pump means having a forward stroke for pumping the first fluid into the first chamber while withdrawing the second fluid from the second chamber, to thereby move the piston in a first direction;
said pump means having a return stroke for pumping the second fluid back into the second chamber while withdrawing the first fluid from the first chamber, to thereby move the piston in a second direction; and means on said tool for admitting gas into said second fluid to thereby form a gas-liquid foam mixture.

4,878,373

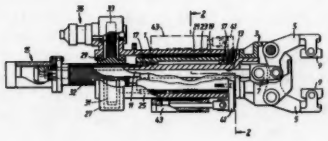
PEEL ASSEMBLY FOR AN INGOT MANIPULATOR

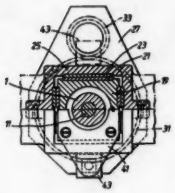
Geoffrey Wilson, and Trevor Hemingway, both of Sheffield, England, assignors to Dave McKee (SHeffield) Limited, Yorkshire, England

PCT No. PCT/GB88/00153, § 371 Date Nov. 2, 1988, § 102(e) Date Nov. 2, 1988, PCT Pub. No. WO88/06499, PCT Pub. Date Sep. 7, 1988
PCT Filed Mar. 2, 1988, Ser. No. 269,738
Claims priority, application United Kingdom, Mar. 3, 1987, 8704931
Int. Cl.[4] B21D *43/10;* **B21J** *13/12*
U.S. Cl. 72—420 **10 Claims**

1. A peel assembly for a manipulator comprising
an elongate shaft having an enlarged head at one end thereof and at least two co-operating jaws pivotally secured to the head;
an elongate inner housing surrounding part of the shaft and carrying bearings which support the shaft for angular rotation about its longitudinal axis;
an elongate outer housing fitted around the inner housing so as to prevent relative rotation therebetween and with co-operating surfaces on the two housings which permit the inner housing to slide in the direction of its length relative to the outer housing;

first drive means for rotating the shaft about its longitudinal axis and second drive means connected to the inner hous-





ing for sliding the inner housing and the shaft relative to the outer housing.

4,878,374

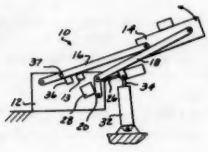
FIVE BAR LINKAGE MECHANISM

Richard E. Nelson, 53 E. Tacoma, Clawson, Mich. 48017

Filed May 20, 1988, Ser. No. 196,241

Int. Cl.[4] B21J *13/00*

U.S. Cl. 72—446 **12 Claims**



1. A five bar articulating mechanism, comprising:

a base defining a first bar;

a second bar spaced upward from the first bar in a parallel opposed manner;

a third bar pivotally linked at a lower end to a left end of the first bar, and pivotally linked at an upper end to a right end of the second bar;

a fourth bar pivotally linked at an upper end to a left end of the second bar, the fourth bar extending downward and to the right, crossing the third bar;

a fifth bar pivotally linked at a first end to the first bar, and pivotally linked at a second end to a lower end of the fourth bar;

wherein the mechanism is movable from a first position wherein the second bar is spaced above and opposed to the first bar, to a second position wherein the first and second bars are in a non-parallel, non-opposed position, the mechanism further comprising:

means, acting on one of the bars, for selectively rigidly positioning the one bar non-pivotally with respect to an adjacent bar, the positioning means causing the mechanism to operate as a four bar articulating mechanism, thus stopping the mechanism at the second position, when the means positions the one bar non-pivotally, and the positioning means further causing the mechanism to operate as a five bar articulating mechanism, thus allowing the mechanism to move to a third position wherein the second bar is rotated 180° and positioned adjacent the first bar, when the means allows the one bar to pivot.

4,878,375

DEVICE FOR MEASURING HYDROGEN CONCENTRATION IN AN ALUMINUM MELT

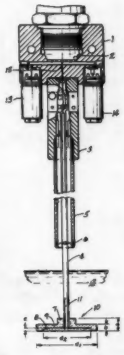
Rolf Roggen, Sion, Switzerland, assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Filed May 1, 1989, Ser. No. 345,958

Claims priority, application Switzerland, May 10, 1988, 1774/88

Int. Cl.[4] G01N *7/10*

U.S. Cl. 73—19 **15 Claims**



1. Device for measuring the concentration of hydrogen in an aluminum melt which comprises: a measuring head; a pressure gauge associated with said measuring head; a capillary tube of melt-resistant material that is impermeable to hydrogen connected to said pressure gauge; and an immersion probe that is permeable to hydrogen and is made of melt-resistant ceramic material connected to said capillary tube, wherein the immersion probe comprises at least two, essentially plate-shaped diffusion membranes that in each case form a common interface, and wherein the capillary tube communicates freely with said interface.

4,878,376

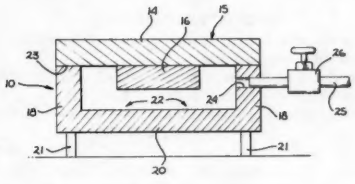
METHOD AND APPARATUS FOR TESTING SPUTTER TARGETS

Mark Leonov, and Jan Kordel, both of Santa Clara, Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Dec. 27, 1988, Ser. No. 290,163

Int. Cl.[4] G01M *3/26*

U.S. Cl. 73—40 **11 Claims**



1. A device for testing sputter targets comprising:

a base, said base having a shape which conforms generally to the shape of said sputter target;

at least one sidewall connected to said base at a peripheral edge thereof and extending vertically upward, said sidewall and said base defining a cavity, said sidewall having disposed therein a passage way;

an evacuation means coupled to said passageway for evacuating ambient air from said cavity.

4,878,377

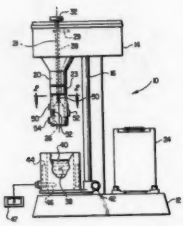
VISCOMETER APPARATUS AND METHOD

James C. Abel, Cedar Hill, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Oct. 7, 1988, Ser. No. 255,003

Int. Cl.[4] G01N *11/14*

U.S. Cl. 73—59 **6 Claims**



1. A viscometer apparatus for measuring the viscosity of relatively viscous fluids such as thermally activated fracturing fluids for hydraulically fracturing earth formations, said apparatus comprising:

a rotor member adapted to be driven at a selected speed, said rotor member including a generally tubular body part having an inner cylindrical wall of substantially constant radius;

a stationary bob comprising a generally cylindrical part having an outer cylindrical surface of substantially constant radius and disposed in sleeved relationship within said rotor member to provide an annular space in which a quantity of fluid whose viscosity is to be measured is sheared at a predetermined rate by rotating the rotor member relative to the cylindrical part, said cylindrical part being connected to means for determining the torsional effort exerted on said bob;

container means for containing a quantity of fluid to be tested, said container means being supported for placement of said rotor member and said bob in a chamber formed by said container means; and

means on said rotor member comprising a plurality of mixing blades projecting radially outwardly from said body part with respect to the longitudinal central axis of said body part for mixing said fluid in said container means during rotation of said rotor member to provide uniform temperature distribution throughout said fluid in said container means during measurement of the viscosity of said fluid.

4,878,378

ROTATING VISCOMETER

Manabu Harada, Tokyo, Japan, assignor to Kabushiki Kaisha Marukomu, Tokyo, Japan

Continuation-in-part of Ser. No. 7,342, Jan. 28, 1987, abandoned. This application Feb. 3, 1988, Ser. No. 181,474

Claims priority, application Japan, Jan. 29, 1986, 61-11422[U]

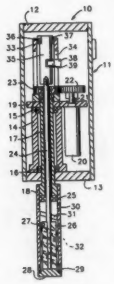
Int. Cl.[4] G01N *11/14*

U.S. Cl. 73—59 **15 Claims**

1. In a rotating viscometer including relatively stationary and rotatable members supported on a common axis, the members having spaced, mutually facing surfaces to define a clearance gap located between the surfaces and extending in generally parallel relation to the surfaces between opposite ends, the improvement comprising:

means defining a fluid inlet at one end of said clearance gap and a fluid outlet at the other end of said clearance gap; and

means defining spiral flutes on at least one of said surfaces, said spiral flutes having a pitch angle (θ), a width (e) and being spaced along the length of said clearance gap to define spiral grooves of a width (W) in said one surface;



said pitch angle (θ), flute width (e) and said groove width (W) being selected so that upon movement of the rotatable member relative to the stationary member, fluid introduced at said fluid inlet is advanced through said clearance gap to said fluid outlet under shearing forces for measurement of the viscosity of the fluid and so that the shearing time and shear rate remain substantially constant.

4,878,379

RHEOMETER

John J. Deer, Epsom, United Kingdom, assignor to Carri-Med Ltd., Worthing, United Kingdom

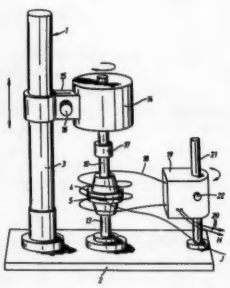
PCT No. PCT/GB86/00625, § 371 Date Jun. 3, 1987, § 102(e) Date Jun. 3, 1987, PCT Pub. No. WO87/02458, PCT Pub. Date Apr. 23, 1987

PCT Filed Oct. 16, 1986, Ser. No. 79,778

Claims priority, application United Kingdom, Oct. 17, 1985, 8525662

Int. Cl.[4] G01N *3/24*

U.S. Cl. 73—60 **15 Claims**



1. A rotational rheometer comprising two shearing elements between which a sample of material to be tested can be located, means for applying a rotational force to at least one of said elements so as to subject a sample between said elements to a controlled shear force, means for heating the sample to a controlled extent, and means for automatically indicating a defor-

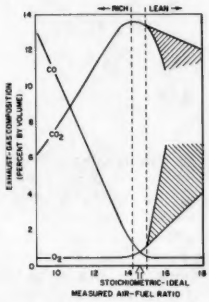
mation or flow parameter of the material under the applied force, at least one said shearing element comprising electrically conductive material and the heating means comprising an induction heater having at least one induction heating coil or loop located to permit induction heating of said electrically conductive material.

4,878,380

METHOD OF TESTING CATALYTIC CONVERTERS AND OXYGEN SENSORS

Lynn R. Goodman, 3240 Sleeping Lady Lane, Anchorage, Ak. 99515

Filed Oct. 3, 1988, Ser. No. 252,386
Int. Cl.[4] G01M *15/00*
U.S. Cl. 73—118.1 **5 Claims**



1. A method for testing catalytic converters used in combination with internal combustion engines having an intake manifold, and an exhaust system, being used in vehicles, comprising the steps of:

(a) operating the internal combustion engine to operating temperature;

(b) injecting a subsidiary air-fuel mixture into the intake manifold, said subsidiary air-fuel mixtue being supplied from a source external to the internal combustion engine;

(c) adjusting the subsidiary air-fuel mixture until the exhaust gasses produced by the internal combustion engine are equal to about: 14.7 percent carbon dioxide, and between about 1.0 and 1.4 percent oxygen;

(d) reading the output of carbon monoxide produced by the engine when the percentage of gasses produced in step c are reached.

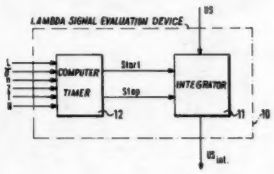
4,878,381

EVALUATION DEVICE FOR MEASURING SIGNALS OF A LAMBDA PROBE

Winfried Moser, Ludwigsburg, and Christian Klinke, Ludwigsburg-Hoheneck, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Nov. 23, 1988, Ser. No. 275,711
Claims priority, application Fed. Rep. of Germany, Dec. 21, 1987, 3743315
Int. Cl.[4] G01M *15/00*
U.S. Cl. 73—118.1 **13 Claims**

1. An evaluation device for neutralizing interference components of a measuring signal from a lambda probe arranged in an exhaust gas stream of an internal combustion engine, comprising means for computing from predetermined operational variables of the engine periods of pressure pulsation of the exhaust gas; means for integrating the measuring signal from the probe for an adjustable time interval to produce an integrated output signal; and means for timing said integrating means to integrate for a time interval corresponding to an integer multiple of a period of pressure pulsations computed by said computing means such that the integrated output signal



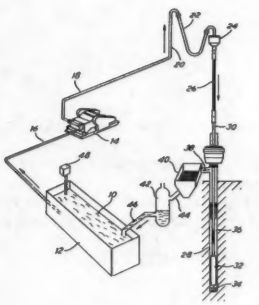
corresponds to an interference free measuring signal from the probe.

4,878,382

METHOD OF MONITORING THE DRILLING OPERATIONS BY ANALYZING THE CIRCULATING DRILLING MUD

Timothy G. J. Jones, Cottenham, and Trevor L. Hughes, Cherry Hinton, both of England, assignors to Schlumberger Technology Corporation, Houston, Tex.

Filed Oct. 27, 1988, Ser. No. 263,499
Claims priority, application United Kingdom, Nov. 14, 1987, 8726727
Int. Cl.[4] E21B *47/00*
U.S. Cl. 73—153 **11 Claims**



1. A method of monitoring the drilling operations by analyzing the circulating drilling mud, characterized by sampling periodically the mud at the surface, after elimination of the cuttings, and analyzing the samples to determine the successive values as a function of time or depth of a parameter representative of the weight of fine solids present in the mud.

4,878,383

OPTICAL FLUID LEVEL SENSOR

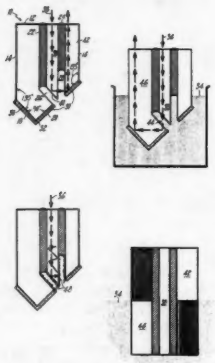
Walter J. Wiegand, Jr., Glastonbury, and Robert H. Bullis, Avon, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 2, 1987, Ser. No. 115,304
Int. Cl.[4] G01F *23/00*
U.S. Cl. 73—293 **13 Claims**

1. An optical sensor for detecting fluid level said sensor comprising:

a first passageway for conducting a signal beam into the sensor, a second passageway for conducting said signal beam from said sensor such that said signal beam may be detected, said first passageway being separated from said second passageway by a first opaque member, a third passageway for conducting said signal beam from said

sensor such that said signal beam may be detected said third passageway being separated from said first passageway by a second opaque member,



a first means for conducting said signal beam from said first passageway to said second passageway if said fluid level is relatively high, and a second means for conducting said signal beam from said first passageway to said third passageway if said fluid level is relatively low.

4,878,384

DEVICE FOR EVALUATING AND MEASURING HUMAN SENSORY PERCEPTION

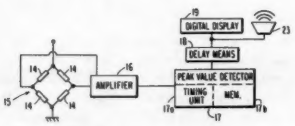
Theodor Bruhn, Calenberger Strasse 15, D-3017, Pattensen, Fed. Rep. of Germany

Filed Jan. 25, 1988, Ser. No. 147,966

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1987, 3702808

Int. Cl.[4] A61B *5/22*; G01D *1/00*

U.S. Cl. 73—379 **7 Claims**



1. Device for evaluating and measuring human sensory perceptions comprising:

a finger button;

signal generating means for generating a muscle force signal indicative of a maximum muscle force applied to the finger button;

a display means responsive to the muscle force signal for displaying the maximum muscle force;

a time measuring device responsive to muscle force applied to the finger button for commencing a time measuring operation; and

delay means for delaying display of the maximum muscle force by the display means for a predetermined delay period whereafter the display means displays the maximum muscle force for a time measured by the measuring device.

4,878,385

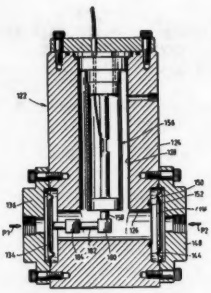
DIFFERENTIAL PRESSURE SENSING APPARATUS

Sheldon G. Lloyd, Austin, Tex., assignor to Fisher Controls International, Inc., Austin, Tex.

Filed Feb. 2, 1988, Ser. No. 151,557

Int. Cl.[4] G01L *7/08, 9/00*

U.S. Cl. 73—704 **24 Claims**



17. An apparatus for sensing differential pressures comprising:

a housing having an inner chamber filled with a substantially incompressible working fluid;

a first diaphragm in said housing for separating a fluid having a first pressure from said inner chamber;

a second diaphragm in said housing for separating a fluid having a second pressure from said inner chamber, the difference between said first and second pressures creating a differential pressure;

a core mounted within a cylindrical tube positioned within said chamber having a first end anchored to said housing, a second end coupled to said first diaphragm, and a relatively flexible intermediate section which flexes in response to said differential pressure; and

a strain sensor mounted on said core adjacent said flexible intermediate section for sensing forces applied to said core by said first diaphragm.

4,878,386

KARMAN VORTEX SENSOR TYPE FLOW RATE MEASURING SYSTEM

Toshiaki Isobe, Nagoya, and Hidehiro Oba, Aichi, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Division of Ser. No. 884,187, Jul. 10, 1986, Pat. No. 4,819,490. This application Sep. 7, 1988, Ser. No. 241,219

Claims priority, application Japan, Jul. 16, 1985, 60-155083; Sep. 3, 1985, 60-193207

The portion of the term of this patent subsequent to Apr. 1, 2006, has been disclaimed.

Int. Cl.[4] G01F *1/32*

U.S. Cl. 73—861.22 **4 Claims**

1. A flow rate measuring system comprising:

(a) a Karmen vortex sensor for generating a signal having a period in response to a flow rate of a fluid;

(b) means for calculating said period of said signal, said period calculating means comprising

(i) means for shaping a waveform of said signal into a pulse-shaped signal;

(ii) means for counting the number of pulses of said pulse-shaped signal within a definite time period;

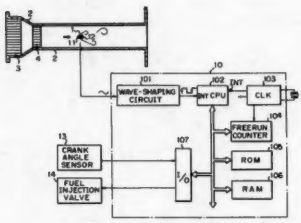
(iii) means for calculating a total of the time periods of all of said pulses of said pulse-shaped signal within said definite time period;

(iv) means for calculating a means value by dividing said total of the time periods by the number of pulses within

said definite time period, only when the number of pulses is not zero; and

(v) means for blunting said means value for said definite time period by

where T is a new means value, TQF is a mean value for



a preceding definite time period, and x is a weighting constant;

(c) means for calculating a correction coefficient in accordance with said period of said signal; and

(d) means for calculating said flow rate of a fluid in accordance with said blunted means value of the period of said signal and said correction coefficient.

4,878,387

AUTOMOTIVE INSTRUMENT

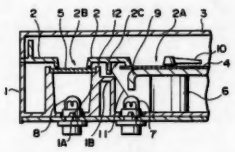
Masahiro Muramatsu, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan

Filed Jan. 28, 1988, Ser. No. 149,604

Claims priority, application Japan, Feb. 24, 1987, 62-25040[U]

Int. Cl.⁴ G01D *11/28*

U.S. Cl. 73—866.3 **2 Claims**



1. In an automotive instrument having a case, a meter plate providing a display panel and carrying a meter scale plate and at least one, indicator lens, wherein said meter scale plate and indicator lens are arranged in side-by-side configuration and separated from the meter plate by a gap, and a light source for illuminating the meter scale plate, the improvement comprising:

a light-shielding projecting wall projecting from a rear side of said meter plate, so as to prevent a portion of light from said light source for illuminating said meter scale plate from leaking through said gap to reach said indicator lens; and

a light-shielding structure positioned transverse to the projecting wall and the light source for illuminating the meter scale plate, so as to prevent the remaining portion of light from said light source for illuminating said meter scale plate from leaking through said gap to reach the indicator lens.

4,878,388

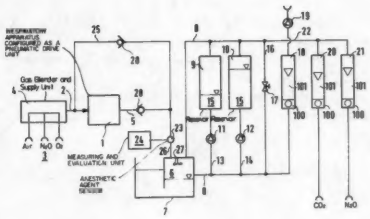
METHOD FOR SIMULATING AND DEMONSTRATING THE GAS EXCHANGE DURING MANDATORY OR ASSISTED VENTILATION AND APPARATUS THEREFOR

Patrick J. Loughlin; Dwayne R. Westenskow, both of Salt Lake City, Utah; Henrich A. Wied, Bad Schwartau, and Carl-Friedrich Wallroth, Lübeck, both of Fed. Rep. of Germany, assignors to Dräigerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany

Filed Nov. 27, 1987, Ser. No. 126,175

Int. Cl.⁴ G09B *23/28*

U.S. Cl. 73—866.4 **14 Claims**



1. A method for demonstrating and simulating the exchange of gases during mandatory or assisted ventilation wherein breathing gas passes through a breathing circuit and wherein a breathing gas mixture including oxygen is prepared in a gas supply unit for metering the same into the breathing circuit, the method comprising the steps of:

metering anesthetic agent into said breathing gas mixture;

passing the breathing gas mixture through reservoir means filled with organic oil simulating a body which is being ventilated whereby portions of the anesthetic agent are dissolved in the oil in said reservoir means;

measuring the quantity of anesthetic agent in said breathing gas mixture after the latter has passed through said reservoir means; and,

regulating the quantity of anesthetic agent added to said breathing gas mixture in correspondence to the amount of said anesthetic agent dissolved in said oil.

4,878,389

BELLOWS FOR PROTECTING KNUCKLE JOINTS

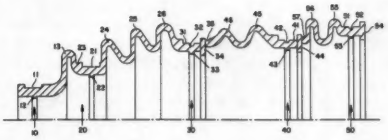
Ferdinand Boge, G. Keller 35, 6204 Taunusstein, Fed. Rep. of Germany

Filed Nov. 16, 1988, Ser. No. 271,688

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813782

Int. Cl.⁴ F16J *15/50*

U.S. Cl. 74—18.1 **7 Claims**



1. A bellows for protecting knuckle joints comprising:

two end sections, each with a cylindrical surface means for connection to a machine part, one of said end sections being a larger diameter end section having a larger diameter than the other of said end sections;

a first T-flange formed in said larger diameter end section;

a first fold adjoining said larger diameter end section;

an end groove for receiving a tightening strap, positioned in

said larger diameter end section, and delimited by said first T-flange and said first fold;

a plurality of connecting points including cylindrical surfaces of smaller diameter than said larger diameter end section, each connecting point having a T-flange, a strap groove for receiving a tightening strap, and a separating groove associated with each connecting point, each connecting point allowing connection to a different sized disk.

4,878,390

LINEAR POSITIONING APPARATUS

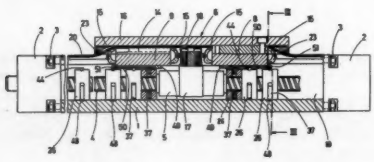
Karlheinz Hauser, Steinenbronn, Fed. Rep. of Germany, assignor to Neff Gewindespindeln GmbH, Waldenbuch, Fed. Rep. of Germany

Filed Jan. 18, 1989, Ser. No. 298,633

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1988, 3804117

Int. Cl.[4] F16H *1/18*

U.S. Cl. 74—89.15 19 Claims



1. Linear positioning apparatus having an elongated support (1);

a spindle (4) extending parallel to said support and rotatably retained therreon, and a spindle nut (5) longitudinally slidably retained on the spindle and movable along the support in respectively opposite directions upon rotation of the spindle, said spindle nut defining oppositely located end portions facing the ends of the elongated support and forming, respectively, leading and trailing end portions, in dependence on the direction of movement of the spindle nutf

at least one spindle support element for supporting the spindle between the ends of the support, and spaced therefrom,

wherein

each of the spindle support elements (26, 226) includes

a body portion (26') and a movable, resiliently biassed engagement element (37, 45) projectable from the body portion;

the support (1) is formed with at least one stop means (48) and positioned for engagement by the projectable engagement element (37, 45) of the spindle support element (26, 26') while being releasable from said engagement by axial movement of the leading end portion of the spindle nut (5) against the support element;

a take-up carrier means (49, 50,51) is provided, located at an end portion of the spindle nut (5) for carrying along and moving the at least one released support element located at a trailing end portion of the spindle nut; and

movable connecting dog means (44, 53) are provided, located on the least one support element (26, 226) engageable with said take-up carrier means (49, 50, 51) upon release of the projectable engagement element (37, 45) from the at least lone stop means while being disengaged from said take-up carrier means when said projectable engagement element engages with said stop means.

4,878,391

MOTION TRANSLATING MECHANISM FOR USE AS A WINDOW REGULATOR OR THE LIKE

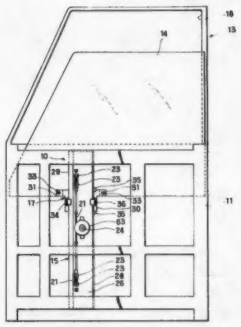
Haruo Komatsu, and Takashi Suzuki, both of Shimizu, Japan, assignors to Koito Seisakusho Co., Ltd., Japan

Filed Feb. 16, 1988, Ser. No. 155,679

Claims priority, application Japan, Feb. 16, 1987, 62-32970; Jan. 12, 1988, 63-4388

Int. Cl.[4] E05F *5/06;* E05D *3/00*

U.S. Cl. 74—89.2 6 Claims



1. A motion translating mechanism for use as a vehicular window regulator or the like, comprising;

(a) elongate guide rail means curved longitudinally to provide a convex side and a concave side and defining a substantially linear guide way on its convex side, a pair of longitudinally spaced openings being defined in said guide rail means;

(b) a pair of terminal guides mounted to the convex side of the guide rail means adjacent opposite ends thereof;

(c) an elongate member of flexible, non-stretchable material looped about the terminal guides and so providing first and second stretches thereof, at least a first stretch of the elongate member extending along the guide way, and a second stretch of the elongate member extending through one of the openings from the convex toward the concave side of the guide rail means;

(d) a drive reel mounted to the guide rail means intermediate the opposite ends thereof and rotatably mounted to the concave side of the guide rail means, the second stretch of the elongate member extending through one of the openings from the convex toward to the concave side of the guide rail means and being wound at least one turn around the drive reel, and extending through the other opening from the concave back to the convex side of the guide rail means; and

(e) a movable member mounted to the guide rail means and coupled to the first stretch of the elongate member for joint bidirectional movement therewith along the guide way.

4,878,392

GEAR DRIVE FOR SHUTTLELESS LOOMS

Siegfried Jaeger, and Wilhelm Herrlein, both of Lindau/B, Fed. Rep. of Germany, assignors to Lindauer Dornier Gesellschaft m.b.H., Lindau/B, Fed. Rep. of Germany

Filed Sep. 23, 1988, Ser. No. 249,418

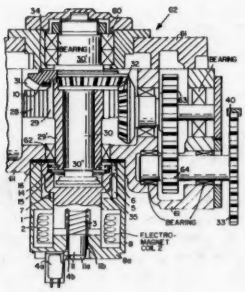
Claims priority, application Fed. Rep. of Germany, Sep. 23, 1987, 3731990; Aug. 1, 1988, 3826156

Int. Cl.[4] F16H *5/06*

U.S. Cl. 74—333 14 Claims

1. A gear drive for driving a weft thread insertion member in a shuttleless loom, comprising housing means for supporting said gear drive, a first group of drive means forming a driving

gear set, and a second group of drive means forming a driven gear set, shaft means (30) mounted for rotation in said housing means, said first group of drive means including a pinion sleeve (29') and a driving pinion (29) rigidly secured to said pinion sleeve (29'), said pinion sleeve being mounted for rotation on and relative to said shaft means (30) and for axial displacement relative to said shaft means (30), said second group of drive means comprising a driven gear (31) rigidly secured to said shaft means (30) for rotation with said shaft means, coupling means (10) operatively interposed between said driving pinion (29) and said driven gear (31) for transmitting a driving force from said driving pinion (29) to said driven gear (31), said coupling means comprising a first coupling member (12) at an axially facing end of said pinion sleeve (29') and a second coupling member (13) rigidly secured to said driven gear (31) for cooperation with said first coupling member (12) when said pinion sleeve (29') is in a coupling means engaging position,



drive means for operating said coupling means, said drive means including an armature, means for securing said armature against rotation in said housing means while permitting an axial displacement of said armature in the direction of a rotational axis of said shaft means (30), means (14) connecting said armature to said pinion sleeve (29') in a form-locking manner for axially displacing said pinion sleeve (29') while permitting rotation of said pinion sleeve relative to said armature, and cooperating clamping means (15, 35) for rigidly attaching said shaft means (30) to said armature (1) in any rotational or angular position of said shaft means (30) when said pinion sleeve (29') is moved into a coupling means disengaging position by said armature and for detaching said shaft means from said armature when said pinion sleeve is moved into a coupling means engaging position by said armature, whereby said shaft means cannot rotate when said coupling means are disengaged and can rotate when said coupling means are engaged.

4,878,393

DEXTROUS SPHERICAL ROBOT WRIST

Oprea Duta, 510 W. Belmont, #2109, Chicago, Ill. 60657, and Michael M. Stanisic, 779 Colfax, Elmhurst, Ill. 60126

Filed May 27, 1988, Ser. No. 199,902
Int. Cl.[4] B25J *17/02*
U.S. Cl. 74—479 **20 Claims**

1. A mechanical wrist connectable between a first and second arm comprising:

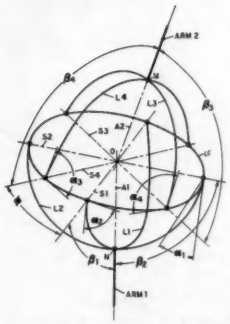
a central link providing at least a first pair of opposed pivot points lying on a first pivot means;

a first semicircular link pivotally connected to said central link at said first pair of pivot points for pivoting movement in a first hemisphere about said first pivot axis;

a second semicircular link pivotally connected to said central link at a second pair of pivot points lying on a second pivot axis for pivoting movement in a second hemisphere, said first pivot axis substantially intersecting said second pivot axis at a point fixed relative to the wrist;

a first block mounted for sliding movement along said first semicircular link;

means for connecting said first arm to said first block;



a second block mounted for sliding movement along said second semicircular link; and

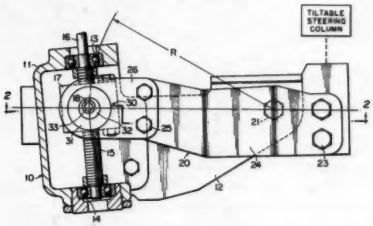
means for connecting said second arm to said second block.

4,878,394

DRIVE MECHANISM FOR TILTABLE STEERING COLUMN

Yoshiyuki Nakamura, Nara, and Teruo Koyama, Okazaki, both of Japan, assignors to Koyo Seiko Kabushiki Kaisha, Japan

Filed Jun. 27, 1988, Ser. No. 212,341
Claims priority, application Japan, Jun. 25, 1987, 62-156632
Int. Cl.[4] B62D *1/18;* **F16H** *29/20*
U.S. Cl. 74—493 **1 Claim**



1. A drive mechanism for a tiltable steering column of a vehicle comprising:

a fixed bracket fixedly supportable on a vehicle during use of the drive mechanism;

a movable bracket pivoted on said fixed bracket for supporting a tiltable steering column at its one end during use of the drive mechanism;

a drive shaft having a lead screw supported by said fixed bracket;

a nut member engaging with said lead screw so that said nut member is movable along an axial line of said lead screw as said lead screw rotates, said nut member including a fixed shaft having an axial line perpendicular to said axial line of said lead screw; and

a bearing assembly secured to the other end of said movable bracket, said bearing assembly including a large bearing supported by said movable bracket, an eccentric collar fixed inside said large bearing, and a small bearing fixed on said eccentric collar at its eccentric position, said small bearing engaging said fixed shaft provided on said nut member;

whereby said eccentric collar generates a turning pair on

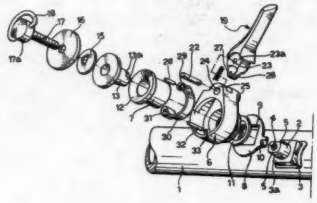
said nut member and said movable bracket when said nut member is moved as said lead screw rotates to thereby convert linear movement of said nut member into angular movement of said movable bracket so that the tiltable steering column supported by said movable bracket is held in a desired angular position.

4,878,395

DEVICE FOR OPERATING THE GEAR CHANGE OF A BICYCLE

Antonio Romano, Padua, Italy, assignor to Campagnolo S.p.A., Vicenza, Italy

Filed Feb. 1, 1988, Ser. No. 150,857
Claims priority, application Italy, Apr. 29, 1987, 67368 A/87
Int. Cl.[4] G05G *5/06*
U.S. Cl. 74—531 **7 Claims**



1. A device for operating the gear change of a bicycle comprising:

a support pin,

a main body rotatably mounted on the support pin,;

an operating lever pivotably mounted on said main body for movement between two end positions,

resilient means resiliently biasing said lever towards one of said end positions,

a driven member adapted to be driven by the main body and rotatably mounted on the support pin,

friction coupling means located disfased between the driven member and the support pin for opposing rotation of the driven member by means of frictional resistance, and

one way engagement means located between the main body and the driven member for coupling the driven member to the main body for rotation only when the lever is rotated in a direction corresponding to movement of said lever towards said one of said end positions,

wherein said one way engagement means is comprised of an engagement member carried by the main body and movable into engagement with said driven member to connect the main body for rotation with the driven member and

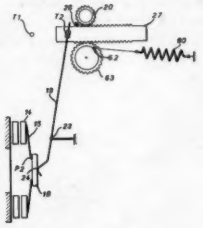
said operating lever is connected to said engagement member whereby upon movement of said lever to said one of said end positions, said engagement member will be moved into engagement with said driven member and upon movement of said lever to another of said two end positions, said engagement member will be moved out of engagement with said driven member.

4,878,396

CONTROL MECHANISM FOR A MECHANICAL COUPLING DEVICE

Pierre Grunberg, Paris, France, assignor to Valeo, Paris, France

Continuation of Ser. No. 475,633, Mar. 15, 1983, abandoned.
This application Oct. 24, 1986, Ser. No. 921,842
Claims priority, application France, Mar. 18, 1982, 82 4603; Feb. 25, 1983, 83 3115
The portion of the term of this patent subsequent to Jun. 9, 2004, has been disclaimed.
Int. Cl.[4] G05G *1/04*; F16D *13/75, 23/12*
U.S. Cl. 74—518 **13 Claims**



1. A motor-driven control mechanism and a mechanical drive control device controlled thereby, which mechanical drive control device includes a first part and a second part movable relative to said first part in both directions through a stroke defined between two limit positions, and elastic return means acting between said first and second parts; said control mechanism comprising linkage means associated with the second part and movable through a stroke simultaneously with the stroke of the second part and acting upon the second part to transfer the second part from a first of said limit positions to a second of said limit positions against the action of said elastic return means, and vice versa, motor-driven positioning means separate from the elastic return means for moving the linkage means under power in both directions throughout the stroke of the linkage means, and elastic force moderating means coupled to said linkage means and opposing the action of the elastic return means throughout the stroke of said second part and thereby reducing the force required to be exerted by said motor-driven positioning means; and force moderating means being operable to exert on said linkage means a force which varies through the stroke of the linkage means in both directions as the force exerted by the elastic return means on said second part.

4,878,397

BICYCLE, HANDLEBAR AND ADAPTER SYSTEM

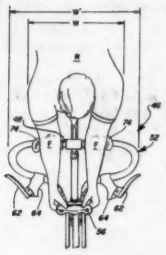
Dan C. Lennon, Box 1177, Hailey, Id. 83333

Continuation-in-part of Ser. No. 1,616, Jan. 9, 1987, Pat. No. 4,750,754. This application Mar. 28, 1988, Ser. No. 173,765
Int. Cl.[4] B62K *21/12, 21/26*
U.S. Cl. 74—551.1 **42 Claims**

1. A bicycle handlebar connectable to a steering post located forwardly of a bicycle seat, comprising:

a crosspiece having a central portion connectable with said steering post and sideways portions extending therefrom, turned portions extending from said sideways portions and extending generally forwardly and inwardly to define a

pair of forward handle portions spaced apart a distance less than the width of the crosspiece, and



a front loop portion interconnecting the forward handle portions whereby all of the portions define a continuous loop forward of the steering post.

4,878,398

DRIVING DEVICE FOR WINDOW WIPER OF MOTOR VEHICLES

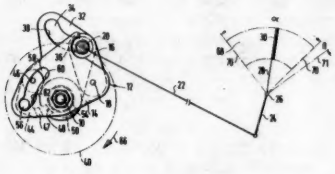
Laurent Heinrich, Strasbourg, France, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Sep. 30, 1988, Ser. No. 252,440

Claims priority, application Fed. Rep. of Germany, Oct. 10, 1987, 3734392

Int. Cl.[4] F16C *3/04*; B60S *1/04*

U.S. Cl. 74—959 **10 Claims**



1. A driving mechanism for a window wiper of a motor vehicle, comprising a cylindrical support fixed to a frame of the motor vehicle and having an indentation in its jacket; a reversible drive shaft arranged for rotation coaxially with said cylindrical support; a crank assembled of two crank plates hinged one to the other; one of said crank plates being secured to said reversible drive shaft and having a first S-shaped cam, and the other crank plate being provided with a crank pin and an oppositely directed first cam follower; a coupling rod hinged at one end thereof to said crank pin and at the other end thereof to a rocking lever for oscillating a wiper blade in a wiping field when the drive shaft rotates in one direction; a control plate supported for rotation about said drive shaft and having a second S-shaped cam cooperating with said first cam follower; means for locking said control plate in a fixed position relative to said cylindrical support when said drive shaft rotates in a reverse direction; a lock pawl pivotably mounted on said control plate and having a second cam follower cooperating with said first S-shaped cam; said first S-shaped cam having one cam section extending concentrically with said drive shaft to guide said lock pawl in engagement with said indentation when said drive shaft rotates in the reverse direction, and another cam section extending in a tangential direction away from said cylindrical support to guide said lock pawl out of engagement with said indentation when said drive shaft rotates in said one direction; and said second S-shaped cam having one cam section extending concentrically with said drive shaft to guide said crank pin on a circular orbiting path when said drive shaft rotates in the one direction, and another cam section directed outwardly away from said orbiting path to guide via said crank pin said wiper blade into a rest position outside said wiping field when the drive shaft rotates in the reverse direction.

4,878,399

PLANETARY SUB-TRANSMISSION

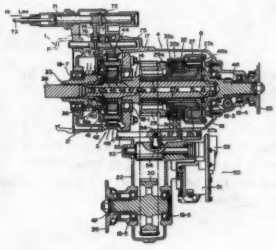
Osamu Kameda, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 29, 1987, Ser. No. 102,217

Claims priority, application Japan, Oct. 2, 1986, 61-151714[U]

Int. Cl.[4] F16H *37/06*

U.S. Cl. 74—665 T **2 Claims**



1. A planetary sub-transmission for a vehicle comprising:

an input shaft and an output shaft, said shafts being axially spaced from and located coaxially relative to each other in a sub-transmission case;

a planetary gear unit having a carrier member fixedly mounted on said output shaft, a ring gear fixedly supported in said sub-transmission case, and a sun gear supported for rotation on said carrier member;

shift means mounted on said input shaft for axial movement between respective positions selectively coupling said input shaft to said sun gear and to said carrier member respectively so as to shift said sub-transmission between a high speed drive range and a low speed drive range; and

means for effecting said axial movement of said shift means,

said carrier member having a sleeve-like member integrally formed therewith and through which the carrier member is fixedly mounted on said output shaft,

said output shaft being received in said sleeve-like member and coupled to said sleeve-like member by splines, the planetary sub-transmission further comprising a bearing through which said sun gear is mounted on said sleeve-like member.

4,878,400

BIAS RATIO LEVELLING APPARATUS OF A WORM GEAR TYPE DIFFERENTIAL

Junzo Kimura, Nagoya, and Toshiyuki Nakao, Chiryu, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Sep. 29, 1988, Ser. No. 250,744

Claims priority, application Japan, Sep. 30, 1987, 62-246282

Int. Cl.[4] F16H *1/38*

U.S. Cl. 74—715 **6 Claims**

1. A bias ratio levelling apparatus for a worm gear type differential comprising:

first and second shafts mounted on a common axis in series,

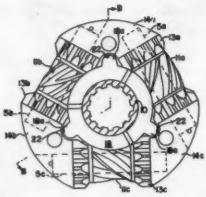
first and second worm gears fixedly connected to opposed end portion of said two shafts,

a first worm wheel directly engaged with said first worm gear,

a second worm wheel directly engaged with said second worm gear,

a rotational member for rotatably supporting said first and second worm wheels about a central axis of each worm wheel and for rotating said first and second worm wheels about said first and second shafts,

a spur gear fixedly connected to each said worm wheel and



for transmitting rotation of said one worm wheel to said other worm wheel, and

a spacer interposed between said first and second worm gears and axially fixed to said rotational member in the axial direction of first and second shafts in such a manner that thrust force generated at one end of the one of said first and second worm gears does not interfere with the other of said worm gears.

4,878,401

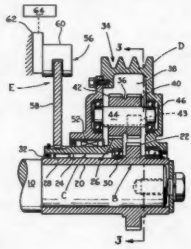
COMBINATION ACCESSORY DRIVE AND SPEED REDUCER

Jackson Chung, 29A Sugar Creek Villas, Greer, S.C. 29650

Filed Sep. 2, 1988, Ser. No. 239,928

Int. Cl.[4] F16H *3/44, 57/10*

U.S. Cl. 74—781 R **20 Claims**



1. A speed reducing accessory drive for an automobile and the like having a crankshaft and a number of accessories which are driven by said crankshaft comprising:

an input sun gear affixed to said crank shaft for rotation with said crankshaft;

a reaction sun gear rotatably carried on said crankshaft;

a combination planet-carrier/drive casing carried on said crankshaft, said drive casing having means for drivably connecting to at least one of said accessories to be driven by said drive casing;

drive means carried by said casing for driving said accessories;

at least one compound planet rotatably carried by said drive casing on an interior of said drive casing having a first planet gear driven by said input sun gear, and a second planet gear of said compound planet which drives said reaction sun gear; and

actuation means for braking said reaction sun gear in a stationary position causing said drive casing to be driven through said compound planet at a prescribed reduced speed ratio to the speed of said crankshaft and in the same direction as said crankshaft, and for releasing said reaction sun gear to cause said drive casing, input sun gear, and input sun gear to rotate in unison with one another so that said drive casing is driven directly with said crankshaft drive.

4,878,402

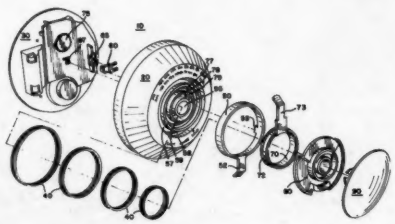
WATER RESISTANT CONTROL LINKAGE

John W. Behringer, 143 Main St., North Kingstown, R.I. 02852

Filed Mar. 9, 1988, Ser. No. 165,749

Int. Cl.[4] F16H *35/18*

U.S. Cl. 74—10.8 **20 Claims**



1. A fluid and particulate matter resistant control linkage assembly for controlling an associated device comprising:

a ring;

a handle affixed to said ring;

a circular groove defined in a housing with said ring rotatably disposed within said groove;

means disposed within said groove to seal out fluids or particulate matter from said groove;

a retainer fixed to retain said ring within said groove; and

means affixed to said ring to link said ring to the interior side of said housing.

4,878,403

MANUFACTURE OF ROTARY DRILL BITS

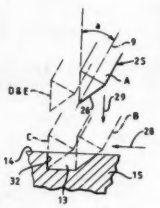
John D. Barr, Cheltenham, England, assignor to Reed Tool Company Limited, Monkstown, Northern Ireland

Filed Nov. 2, 1988, Ser. No. 266,096

Claims priority, application United Kingdom, Nov. 3, 1987, 8725668

Int. Cl.[4] B21K *5/20*

U.S. Cl. 76—107 R **5 Claims**



1. A method of making a mould for use in the manufacture of a bit body by a powder metallurgy process, the method comprising the steps of forming a hollow mould in the configuration of at least a portion of the outer surface of the bit body, and then forming in the interior surface of the mould a plurality of elongate pockets, each of which pockets is at least partly to receive a portion of a thermally stable cutting element, which portion has sloping longitudinal sides and a flat trans-

verse front face, characterised in that each said pocket is machined from the mould material by means of a conical tool rotating about its axis, said axis being inclined to the perpendicular in a plane containing the required longitudinal axis of the pocket, a main elongate part of the pocket then being formed by translatory movement of the tool longitudinally thereof, and the pocket being formed with a flat transverse end face by translatory movement of the tool transversely of the longitudinal axis of the pocket.

4,878,404

ELECTRIC SCREWDRIVER

Hsieh-Yuan Liao, No. 33-35; Lane 246, Hsin Ming Road, Nei Hu Dist., Taipei, Taiwan

Filed Sep. 14, 1988, Ser. No. 245,987
Int. Cl.[4] B25B *21/00*
U.S. Cl. 81—54 **1 Claim**

1. An electric screwdriver comprising a housing securing therein a motor, a power output end rotatably mounted said housing and driven by said motor, a control hollow cylinder having a first end secured to said housing and a second opposite end, an active shaft connected to said power output end and rotatably mounted in said control cylinder, a cap hollow cylinder, a torsion-adjusting hollow cylinder mounted between said cap cylinder and said second opposite end, a driver mounting piece axially slidably mounted in said cap and torsion-adjusting cylinders, a following shaft mounted between said mounting piece and said active shaft for transmitting a rotating power from said active shaft to said driver mounting piece, and a spiral spring mounted between said cap and torsion-adjusting cylinders for providing a spring force against said following shaft, characterized in that: said mounting piece has an engaging end, which is the end engaging with said following shaft, attaching thereto a flange;

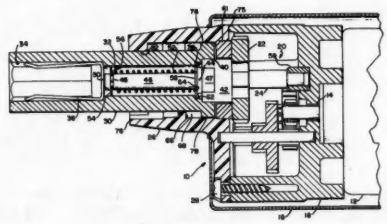
said control cylinder mounts thereon a photic control switch electrically connected to said motor to emit a light to de-energize said motor; and said flange attachs thereon a light-shielding piece shielding said light to energize said motor when said mounting piece mounts thereon a driver urging against a screw.

4,878,405

COLLET LOCK FOR POWER TOOL

Jack Wolfe, Greenville, S.C., assignor to Ryobi Motor Products Corp., Pickens, S.C.

Filed Nov. 21, 1988, Ser. No. 276,066
Int. Cl.[4] B25B *17/00*
U.S. Cl. 81—57.31 **12 Claims**



1. In a power tool having a housing, a motor driven shaft within said housing, a bushing fixedly supported on said housing, and a collet supported in said bushing for holding a tool, said collet and said shaft having complementary shaped portions for mating engagement of said collet with said shaft, an arrangement for selectively coupling said collet to either (a) said shaft for rotation therewith or (b) said bushing for locking said collet from rotation, said arrangement comprising:

a rib formed on the interior of said bushing, said rib having a U-shaped portion forming a pocket with the closed end of the U facing a first end of said bushing and spaced therefrom; and

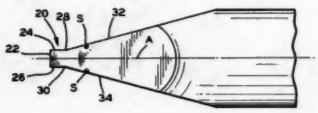
a radial fin on said collet arranged to allow rotation of said collet in said bushing when said fin is between said rib and said first bushing end and to lock said collet to said bushing by interfering contact with said rib when said fin is within said pocket between those portions of said rib forming the walls of the U.

4,878,406

SCREWDRIVER BLADE

Steven C. Simpson, Napoleon, and Warren W. Weible, Defiance, both of Ohio, assignors to SK Hand Tool Corp., Defiance, Ohio

Filed Sep. 28, 1988, Ser. No. 250,166
Int. Cl.[4] B25B *13/48*
U.S. Cl. 81—436 **13 Claims**



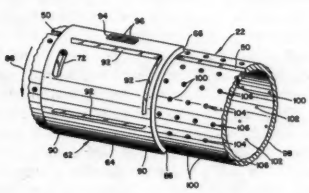
1. A screwdriver blade comprising a shank, a tapered end extending from said shank and terminating in a tip, said tip having a straight edge perpendicular to said shank and having a predetermined thickness, said tip having parallel, planar sides extending back toward said shank from said edge to inner edges a distance equal to the thickness of said edge, opposite side surfaces of said end extending abruptly outwardly from one another in a direction toward said shank from said inner edges of said planar sides at angles of ten to twenty degrees with respect to a longitudinal axis of said screwdriver blade.

4,878,407

VACUUM DIE MOUNT

John R. Harrison, Baltimore; Gary L. Lehr, BelAir, both of Md.; Dennis J. Parr, York, Pa.; William F. Ward, Jr., Hampstead, and Robert R. Wells, Phoenix, both of Md., assignors to The Ward Machinery Company, Cockeysville, Md.

Continuation-in-part of Ser. No. 858,934, May 1, 1986, Pat. No. 4,744,297, which is a continuation-in-part of Ser. No. 776,775, Sep. 17, 1983, Pat. No. 4,683,822. This application May 17, 1988, Ser. No. 194,743
Int. Cl.[4] B26D *7/26*
U.S. Cl. 83—13 **35 Claims**



32. A method of mounting a rotary cutting die, having a

substantially rigid shell, on a die cylinder, comprising the steps of:

placing said die on said die cylinder at a desired lateral and circumferential location with a collapsible seal protruding from said rigid shell contacting a mounting surface of said die cylinder, said seal defining a closed area between said shell and said mounting surface; and

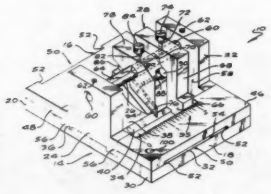
applying vacuum to said closed area to draw said shell into intimate surface contact with said mounting surface and simultaneously collapse said seal.

4,878,408

APPARATUS FOR SLITTING ELONGATED FLEXIBLE TAPE

William C. Isaacson, North Hollywood, and Herbert A. Farmery, Anaheim, both of Calif., assignors to Keen Corporation, New York, N.Y.

Filed May 20, 1987, Ser. No. 52,628
Int. Cl.[4] B26D *1/02, 7/01, 7/26*
U.S. Cl. 83—444 **20 Claims**



1. A portable apparatus capable of being held by hand during use for slitting an elongated strip of flexible material of predtermined width longitudinally into a plurality of strips of preselected width, said apparatus comprising:

a base having a generally rectangular shape with longitudinally spaced front and rear ends and laterally spaced sides, said base forming a generally horizontal support surface for the strip of flexible material and including an upwardly open and laterally extending channel formed therein, said channel having a sloping wall extending from said support surface to the base of said channel and defining therebetween an edge;

a first side edge guide fixed to said base and having a first guide surface disposed to be engaged by and extend parallel to one side edge of said strip of flexible material;

a second side edge guide adjustably mounted to said base and having a second guide surface disposed parallel with said first guide surface, said second side edge guide being adjustable relative to said base to a position laterally spaced from said first side guide by an amount substantially equal to the predetermined width of said strip of flexible material whereby said second guide surface is engaged by the opposite side edge of said strip of flexible material; and

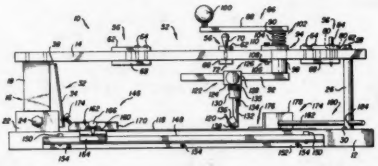
a cutter adjustably mounted to said base and disposed laterally between said first and said second side edge guides, said cutter including a mounting block and a cutter blade removably secured thereto, a portion of said blade projecting downwardly from said block into said channel substantially parallel to said sloping wall to slit said strip of flexible material into the plurality of strips of preselected width, said block including a hold down surface disposed substantially parallel with said support surface forwardly of said channel to slidably clamp the strip of flexible material against said support surface adjacent said blade to prevent distortion of said strip of flexible material during said slitting by said blade.

4,878,409

CIRCULAR MAT CUTTING APPARATUS

Charles H. Carithers, Jr., 5752A Gallant Dr., Jackson, Miss. 39236

Filed Jan. 12, 1988, Ser. No. 143,047
Int. Cl.[4] B26D *5/08, 7/02*
U.S. Cl. 83—466 **25 Claims**



1. An apparatus for cutting circular arcs or holes in a picture mat comprising:

a flat base upon which the mat rests;

a platform provided above said base; and

a cutting means for cutting the mat including

a disc member,

a disc mounting means for mounting said disc member for rotation adjacent said platform about a center axis,

a disc locking means for releasably locking said disc member against rotation about the center axis,

a crank mechanism having an axle extending perpendicularly through said disc member and a mounting arm attached to and extending perpendicular from a bottom end of said axle below said disc member,

a crank mounting means for slidably mounting and releasably locking said crank mechanism to said disc member at a selected one of a plurality of positions along a radial path through the center axis,

a cutting blade,

a blade mounting means for adjustably mounting said cutting blade along said mounting arm and at a cutting angle to the mat;

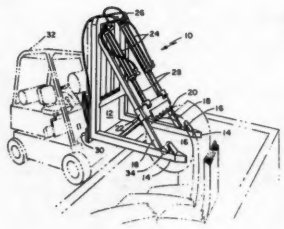
whereby the circle or arc is cut in the mat by rotation of said crank mechanism, at a location determined by the position of said crank mounting means and said disc mounting means, and with a diameter determined by the position of said blade mounting means.

4,878,410

PAPER ROLL SPLITTER

Hoyt C. Darnell, 44 Knapp St., Livermore Falls, Me. 04254

Filed Mar. 21, 1988, Ser. No. 170,545
Int. Cl.[4] B26D *5/12*
U.S. Cl. 83—635 **7 Claims**



1. A paper roll splitter attachment of the guillotine type for mounting on the vertically movable assembly of a fork-lift type vehicle provided with hydraulically powered lift means for raising and lowering said assembly, comprising

a main frame,

means for attaching the back of said frame to said vertically movable assembly,

a pair of generally horizontal mutually spaced lifting arms extending forwardly from the bottom of the front of said frame to be lifted and lowered therewith, the spacing between said arms being at least as great as the length of the roll to be split,

a pair of spaced parallel rails extending downwardly in a diagonal plane from the top of said frame connecting the upper portion of said frame to the outer end portions of said arms,

a cutting blade,

means slidably mounting said blade on said rails for reciprocating motion in a path parallel to said diagonal plane with its cutting edge facing diagonally downward,

hydraulic ram means mounted on said frame in driving relation to said blade for bodily reciprocating the latter in its said path, and

means on the outer ends of said arms for lifting engagement with opposite ends of a shaft extended through the core of a paper roll,

whereby a roll to be split may be transported between said arms to a desired location and there split by said knife driven into it guillotine-wise by said ram means.

4,878,411

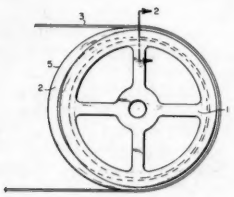
BAND SAW WHEEL

Donald R. Laskowski, Indianapolis, and Daniel R. Tekulve, Batesville, both of Ind., assignors to Laskowski Enterprises, Inc., Indianapolis, Ind.

Filed Dec. 19, 1984, Ser. No. 682,826

Int. Cl.[4] B26D *1/46;* B27B *13/00*

U.S. Cl. 83—820 **8 Claims**



1. In a band saw having a band saw blade, a wheel for supporting the blade, comprising a pulley having a groove extending around its periphery between radially extending flanges, a tire having a lower portion for mating to the pulley's groove and an outer surface, the tire having an inner circumference greater than the circumference of the pulley around the bottom of the groove to permit the tire to be loosely mounted in the pulley's groove and freely movable therein, the blade received against an outer surface of an arcuate portion of the tire and forces the lower portion of that arcuate portion into the groove to form the outer surface of the arcuate portion into a crown, the tire sized to ensure that the outer surface of the arcuate portion against the blade extends radially outwardly of radially outwardly facing edges of the flanges to maintain the outer crowned surface in contact with the blade to keep the blade aligned.

4,878,412

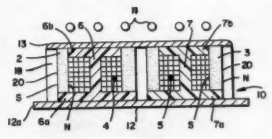
ELECTROMAGNETIC PICKUP FOR A STRINGED MUSICAL INSTRUMENT HAVING FERROMAGNETIC STRINGS AND METHOD

Martin H. Resnick, Rte. 2, Guysville, Ohio 45735

Continuation of Ser. No. 65,051, Jun. 22, 1987, abandoned. This application Jan. 9, 1989, Ser. No. 295,003

Int. Cl.[4] G10H *3/18;* H01F *21/00*

U.S. Cl. 84—726 **5 Claims**



1. An electromagnetic pickup, adapted for use with a stringed musical instrument in which the strings are formed of ferromagnetic material, comprising

a nonconductive, non-magnetic body having at least one hollow cavity,

at least one conducting coil wound on an electrically nonconductive, non-magnetic core form,

a flexible permanently magnetic bushing adjacent to and surrounding said coil,

said coil and magnetic bushing being arranged within said body so that in use they will be disposed perpendicular to the surface of a plurality of the strings of said instrument, whereby said magnetic bushing provides permanent magnet means to direct a magnetic field into said coil and at least one of said strings.

4,878,413

STRING TUNING AND CLAMPING DEVICE

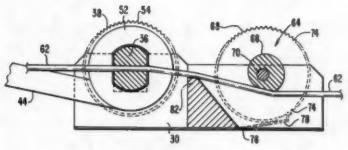
Ned Steinberger, Cornwall, N.Y., assignor to Steinberger Sound Corporation, Newburgh, N.Y.

Filed Jun. 8, 1987, Ser. No. 59,624

The portion of the term of this patent subsequent to Sep. 1, 2004, has been disclaimed.

Int. Cl.[4] G10D *3/12*

U.S. Cl. 84—314 N **14 Claims**



1. A device for clamping and tuning strings which extend longitudinally between and past the nut and bridge of a musical instrument comprising:

a base;

clamping means mounted on the base for clamping the strings at a position past the portion of the string between the nut and bridge; and

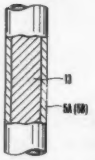
a plurality of cam means, each rotatably mounted on the base proximate to one of the strings at a position past the portion of the string between the nut and bridge and between the clamping means and one of the nut and bridge, for moving longitudinally relative to the extent of the string while displacing the string in a direction generally lateral to the longitudinal extent of the string when the cam means is rotated for adjusting the pitch of the string by adjusting the tension of the string.

4,878,414

MUSICAL INSTRUMENT STAND

Toshinori Yamashita, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Filed Feb. 10, 1989, Ser. No. 308,668
Claims priority, application Japan, Feb. 12, 1988, 63-16268[U]
Int. Cl.[4] G10G *5/00*
U.S. Cl. 84—421 **9 Claims**



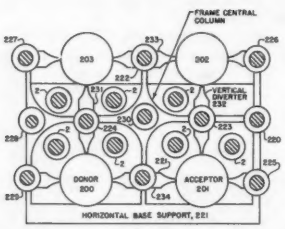
1. A percussion instrument stand comprising:
musical instrument holding means including at least one hollow pipe (5, 20) for holding a percussion instrument;
leg means (2, 7) for supporting said hollow pipe in a predetermined state; and
a vibration damper (13) filled in said hollow pipe.

4,878,415

BOMB PALLET DESIGN WITH HYDRAULIC DAMPING AND FIRE SUPPRESSANT

Joseph C. Foster, Jr., Ft. Walton Beach, and Andrew G. Bilek, Valparasio, both of Fla., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 18, 1988, Ser. No. 234,064
Int. Cl.[4] F42B *57/00, 39/00;* **B65D** *81/08, 85/30*
U.S. Cl. 89—34 **8 Claims**



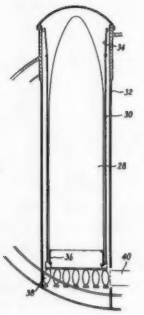
1. A bomb storage pallet for suppressing sympathetic detonation of an acceptor bomb in an event of a detonation of an adjacent donor bomb by shielding the acceptor bomb from fragments and shock to a level below a pressure threshold at which the acceptor bomb would be induced into a sympathetic detonation, said bomb storage pallet also containing fire suppressant chemical extinguishing agents to reduce a fire hazard, in the event of the detonation of the donor bomb, said bomb storage pallet comprising:
a first horizontal base which supports a first and a second bomb which are lying horizontally and which are lying parallel with each other;
a first horizontal diverter which abuts and rests between the first and second bombs along their entire lengths, said first horizontal diverter having a sufficient width to reduce any shock propagated through it by a detonation of either bomb below a pressure threshold at which the first and second bomb would experience a sympathetic detonation, said first diverter having a sufficient height to shield each first and second bomb's silhouettes from fragments from a detonation of either bomb;
a frame which is fixed to said first horizontal base and which holds said first horizontal diverter in place; and
a plurality of tubes which are filled with said fire suppressant chemical extinguishing agents, said plurality of tubes including at least one auxiliary tube which is supported by said frame between said first and second bombs along their entire length and which ruptures upon a detonation of a bomb to release said fire suppressant chemical extinguishing agents and reduce the fire hazard of the detonation to help prevent said sympathetic detonation.

4,878,416

SUSPENSION SYSTEM FOR CYLINDRICAL ELEMENTS IN CONTAINERS

Henri Orquera, La Seyne Sur Mer, and Gérard Jennequin, Six Fours, both of France, assignors to Constructions Industrielles de la Mediterranee, Paris, France

Filed Jul. 1, 1988, Ser. No. 214,224
Claims priority, application France, Aug. 4, 1987, 87 11046
Int. Cl.[4] F41F *3/04*
U.S. Cl. 89—1.810 **12 Claims**



1. A shock-absorbing system for supporting a cylindrical element in a substantially cylindrical housing, comprising:
a multi-spring assembly of a substantially cylindrical configuration including a lower edge member, an upper edge member and a plurality of unitary resilient bars, each forming a spring extending therebetween, said upper edge member being connected to the supported cylindrical element and said lower edge member being connected to the housing, wherein each resilient bar is shaped to have portions which form a means for absorbing multi-directional displacements between the cylindrical element and the housing.

4,878,417

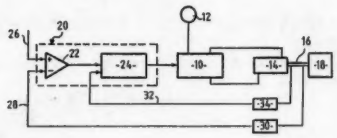
METHOD AND APPARATUS FOR SERVO-CONTROLLING THE POSITION OF A PNEUMATIC ACTUATOR

Pierre Facon, Versailles, France, assignor to Bertin & Cie, Plaisir, France

PCT No. PCT/FR87/00212, § 371 Date Feb. 11, 1988, § 102(e) Date Feb. 11, 1988, PCT Pub. No. WO87/07686, PCT Pub. Date Dec. 17, 1987
PCT Filed Jun. 11, 1987, Ser. No. 159,581
Claims priority, application France, Jun. 12, 1986, 8608513
Int. Cl.[4] F15B *9/03, 9/09*
U.S. Cl. 91—363 R **13 Claims**

1. An apparatus for servo-controlling the position of a pneumatic actuator having a moving member, the apparatus comprising a valve for feeding the actuator with gas under pres-

sure, a position sensor for generating a position signal representative of the position of the moving member, means for determining the speed and the acceleration of the moving member, means for determining the inertia of the moving member from its acceleration at the beginning of its displacement when the actuator is fed at a predetermined constant flow rate of gas under pressure, means for determining speed and acceleration



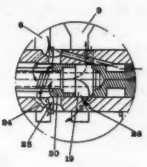
correction factors from said inertia, and a control circuit having an output connected to the valve, an input connected to the position sensor, another input receiving a signal representative of a reference position of the moving member, and means for generating a valve control signal as a function of the difference between the signals at its both inputs and of the speed and acceleration of the moving member as corrected by applying the said correction factors.

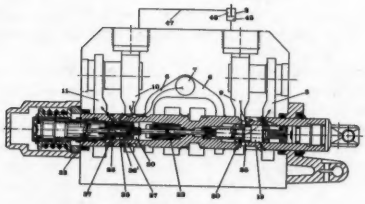
4,878,418

DISTRIBUTOR FOR HYDRAULIC CYLINDERS

Jose M. Badia, Zaragoza, Spain, assignor to Hiab Foco AB, Hudiksvall, Sweden

Filed Dec. 28, 1987, Ser. No. 138,059
Claims priority, application Spain, Dec. 26, 1986, 8603601
Int. Cl.[4] F15B *11/08, 13/04*
U.S. Cl. 91—421 **7 Claims**





1. Distributor for hydraulic cylinders, including:

a body forming for each cylinder a through housing in which a runner is axially moveable;

two chambers for two safety valves;

two intermediate oil inlet ducts from a supply pump which run radially into said housing;

two ducts for the supply and return of oil for advance and withdrawal chambers of the cylinder, said ducts running between the housing and said chambers, one on each side of the intermediate oil inlet ducts; and two ducts for the return of the oil to a tank or deposit, which also run between the housing and the safety valve chambers, and being characterized in

that said runner has two peripheral throats which provide intercommunication between certain of the ducts and is hollow and closed at both ends from which two separate chambers are formed, the first one of which is adjacent to the oil supply and return ducts from the cylinder advance chamber, and the second one of which is adjacent to the ducts for the supply and return of oil for said cylinder withdrawal chamber; one of said throat of the runner being located over each of these chambers, and the first of the said runner chambers comprising, in the side, three series of through holes,

that two of these holes run from the surface of the adjacent peripheral throat, while the third runs from a point close to said throat, between the throat and the closest end of the runner,

that the wall of the second chamber in the runner comprises two through holes, one of which runs from the surface of the adjacent peripheral throat, and the other from a point close to this throat, between the throat and the closest end of the runner,

that the first chamber and holes of the runner form a passage for the circulation of oil between the supply and the return ducts of the oil for the cylinder advance chamber when the runner is in a downward position of the said cylinder, the peripheral throat outside the said chamber moving in this position axially in relation to the tank oil return duct as the oil runs from the cylinder advance chamber without providing an opening between this duct and the one for the supply of oil to the cylinder advance chamber;

that the second chamber and the walls in its side in the meantime form a passage, when the runner is in the same position, between the duct for the supply of oil to the cylinder withdrawal chamber and that for return to the tank, and

that the first chamber has means for varying the size of the cross-section of the said passage, as a function of the return oil pressure from the cylinder withdrawal chamber comprising a first plunger alongside the runner end, which is designed to alter the size of the cross-section of the third set of holes of said chamber, while a second plunger has for its task to alter the cross-section of the intermediate set of holes, the base of said first plunger which is adjacent to the second plunger being subject to the pressure in the chamber plus the tension from a spring which is fitted between the two plungers; while the opposite base is subject to the pressure in the external peripheral throat which receives the duct for supply of oil to the cylinder advance chamber through an interconnecting port running off from the said throat, said second plunger having opposite bases of different cross-section, both of which are under the pressure from the chamber and, as well, from the spring located between the two plungers, on the one hand, and on the other, from an adjustable spring which is set to a value equal or close to the pressure due to a maximum load on the cylinder, while the second chamber has means for opening or closing the connection through the said chamber as a function of the pressure of the oil delivered from the pump to the duct for supply of oil to the cylinder withdrawal chamber.

4,878,419

LIGHTWEIGHT HYDRAULIC ACTUATOR

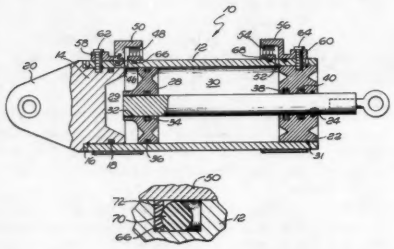
Ralph L. Vick, Granada Hills, Calif., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jun. 27, 1988, Ser. No. 211,960
Int. Cl.[4] F01B *31/00*
U.S. Cl. 92—163 **10 Claims**

1. A lightweight linear hydraulic actuator including a cylindrical barrel, head end and rod end gland members on opposite ends of said barrel, a piston in said barrel dividing said barrel into first and second chambers, a rod attached to said piston

and extending through said rod end gland member, and means connecting a source of hydraulic fluid under pressure to said cylinder on opposite sides of said piston

said means including a first port in the sidewall of said barrel communicating with said first chamber and a second port in the sidewall of said barrel communicating with said second chamber, said ports being axially spaced from said end glands, first and second generally circular grooves in the curved sidewall of said barrel surrounding said first and second ports respectively, and seals in said grooves;



a first fitting member having a passageway communicating with said first port, a second fitting member having a passageway communicating with said second port, said fitting members each having hoop supports surrounding said barrel and internal arcuate surfaces mating with the curved surface of said barrel in contact with said seals, and fastening means fastening said fitting members to said barrel.

4,878,420

ARRANGEMENT FOR CLIMATE CONTROL IN PASSENGER SPACES OF POWER VEHICLES

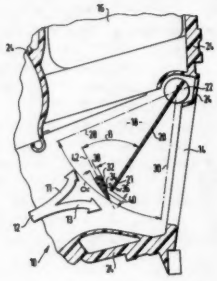
Heinz Rübig, Bühl-Eisenthal, and Thomas Carolus, Achern, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Nov. 16, 1988, Ser. No. 272,543

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1987, 3739737

Int. Cl.[4] B60H *1/24*

U.S. Cl. 98—2.08 **10 Claims**



1. An arrangement for a climate control in passenger spaces of power vehicles, comprising a passage for supplying an air stream; two further passages located downstream of said first-mentioned passage; a branching located between said first-mentioned passage and said further passages; a flap-like member located in the region of said branching and movable between two end positions in each of which it closes a respective one of said further passages, said flap-like member having an end which faces toward said first-mentioned passage and being provided at said end with an auxiliary blade which extends over an essential part of a length of said member; and a turning bearing arranged to support said flap-like member turnably between said positions, said flap-like member having an end which faces away of said turning bearing, said auxiliary blade being arranged at a distance from said end of said flap-like member.

4,878,421

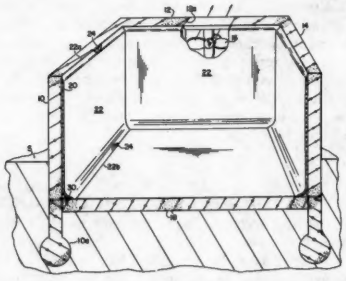
RADON VENTING SYSTEM FOR EXISTING STRUCTURES

Joseph Glasser, Storrs, Conn., assignor to Eljen Corporation, Storrs, Conn.

Filed Jun. 3, 1988, Ser. No. 202,703

Int. Cl.[4] F24F *7/013*

U.S. Cl. 98—42.07 **1 Claim**



1. A method for venting radon gas from the basement of a structure that includes a concrete basement floor and structure supporting walls that rest on footings outside the concrete floor, said method comprising the steps of:

providing panels of rigid plastic material alongside the walls, each panel having opposed faces, and each face having a pattern of raised lands and of depressions on one face that define depressions and raised lands respectively on the opposite panel face,

covering the panels with an impermeable plastic sheet or sheets and overlapping and sealing the sheets to cover the entire basement supporting walls of the structure,

sealing the upper marginal edge of the sheets to the top of the supporting walls,

laying the lower marginal edge of the sheet on the concrete floor so as to cover the joint between the floor and the wall structure,

providing an exhaust fan in a basement window opening of the structure, said sheets also covering said basement window opening,

operating the fan at least intermittently to ventilate the spaces on both sides of the plastic panels and hence to evacuate any buildup of radon gas in the basement due to seepage through cracks in the supporting walls or do to seepage through the joint between the floor and these walls.

4,878,422

UNIVERSAL CEREAL PUFFING APPARATUS

Nancy J. McCullough; Jacob E. Schukman, both of Battle Creek, and Phillip G. Powers, East Leroy, all of Mich., assignors to General Foods Corporation, White Plains, N.Y.

Filed Nov. 18, 1988, Ser. No. 274,232

Int. Cl.[4] A23L *1/18*

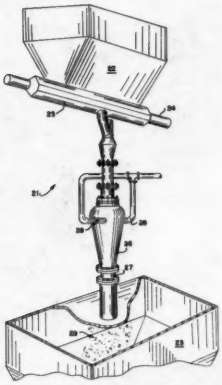
U.S. Cl. 99—323.4 **18 Claims**

1. A cereal puffing apparatus for puffing a variety of different cereal grains or other cereal material, comprising:

chamber means for enclosing and pressurizing a supply of cereal material therewithin, said chamber means having a cereal material inlet end portion and a cereal material outlet end portion, said chamber means having a generally frusto-conical shape that narrows generally between said inlet end portion and said outlet end portion;

nozzle component means for receiving and directing cereal material exiting from said chamber means, said nozzle component means being interchangeably secured to said apparatus at a location downstream of said chamber means; and

steam injector means for introducing a flow of steam into said chamber means, said steam injector means generally opening into said inlet end portion of the chamber means, and said steam injector means o providing a substantially tangental flow of steam into said chamber means.



4,878,423

ELECTRIC TOASTER

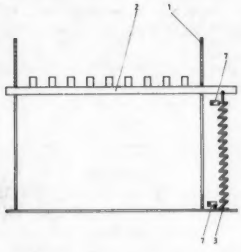
Karl Birkert, Steinbach, and Heinz Marburger, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Rowenta-Werke GmbH, Offenbach am Main, Fed. Rep. of Germany

Filed Apr. 8, 1988, Ser. No. 179,562

Claims priority, application Fed. Rep. of Germany, Apr. 8, 1987, 3711786

Int. Cl.[4] A47J *37/08*

U.S. Cl. 99—332 **4 Claims**



1. An electrical toaster, comprising:

timer means for controlling toasting time;

a movable bread carrier; and

lifting means for moving the bread carrier between a toasting position and toast removal position, the lifting means including at least one spring having temperature-dependent form changing characteristics, the at least one spring being operatively connected to the bread carrier so as to move the bread carrier between the toasting and toast removal positions in response to a temperature change.

4,878,424

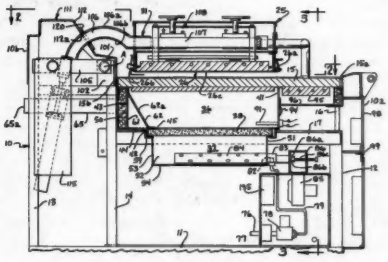
COOKING APPARATUS

Lee F. Adamson, Roscoe, Ill., assignor to Specialty Equipment Companies, Inc., Rockton, Ill.

Filed Nov. 7, 1988, Ser. No. 268,194

Int. Cl.[4] A47J *37/06*; F24C *3/04*

U.S. Cl. 99—349 **16 Claims**



1. A cooking apparatus comprising: a support structure, a lower cooking platen fixedly mounted on the support structure and having forward and rear edges, at least one upper cooking platen, means mounting the upper cooking platen on the support structure for movement therewith between a lower cook position extending generally horizontally above the lower cooking platen and a raised position inclined upwardly from the lower cooking platen, at least one gas fired infrared heater including combustion chamber housing means defining a combustion chamber at the underside of the lower cooking platen; burner plenum chamber housing means defining a burner plenum chamber below the combustion chamber; and a generally horizontal gas permeable burner plate means between and separating the burner plenum chamber from the combustion chamber, input means for introducing a combustible mixture into said burner plenum chamber, the combustion chamber housing means including front, side and rear wall means sealed to the lower cooking platen, the rear wall means defining a horizontally extending vent passage along a rear side of the combustion chamber, said rear wall means including outer wall means having an exhaust outlet and divider wall means inclined downwardly and forwardly relative to the outer wall means and forming a common wall between the combustion chamber and the vent passage, the divider wall means having a vent opening therein whereby combustion gases from the combustion chamber pass through the vent opening and into the vent passage to the exhaust outlet.

4,878,425

APPARATUS FOR PREPARATION OF CONFECTION PRODUCTS

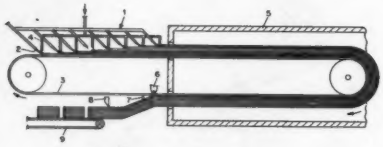
Ian Butcher, Harrow; Gordon S. Carrick, Stroud, and Kevin P. Hillman, Bishops Cleeve, all of England, assignors to Thomas J. Lipton Inc., Englewood, N.J.

Continuation of Ser. No. 753,680, Jul. 10, 1985, abandoned, which is a division of Ser. No. 411,185, Aug. 25, 1982, Pat. No. 4,542,028. This application Jan. 20, 1987, Ser. No. 9,603

Claims priority, application United Kingdom, Aug. 26, 1981, 8125970; Apr. 16, 1982, 8211182

Int. Cl.[4] A23G *9/00*; A23P *1/00*; B29F *3/04*

U.S. Cl. 99—450.2 4 Claims



1. Apparatus for producing an extruded composite frozen confection product comprising slotted extrusion means arranged to extrude in succession at least four thin superimposed layers of a first confection material having a thickness of less than about 5 mm, a take-off conveyor arranged to receive the output of the slotted extrusion means and spray nozzles arranged for spraying a second confection material between successive extruded layers of the first confection material.

4,878,426

REFINING DEVICE

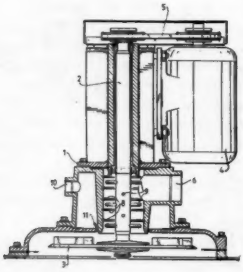
Jan C. Tadema, Bergen, Netherlands, assignor to Wiener & Co. Apparatenbouw B.V., Netherlands

Filed Jun. 1, 1988, Ser. No. 200,974

Claims priority, application Netherlands, Jun. 12, 1987, 8701379

Int. Cl.[4] A23G *1/00*

U.S. Cl. 99—485 8 Claims



1. In apparatus for refining chocolate, the combination of means for mechanically reducing the viscosity of a chocolate mass in a first stage and means for mechanically reducing the viscosity of the chocolate mass and forming a thin film of chocolate in a second stage, and means for supplying air to the thin film of chocolate during the second stage of viscosity reduction.

4,878,427

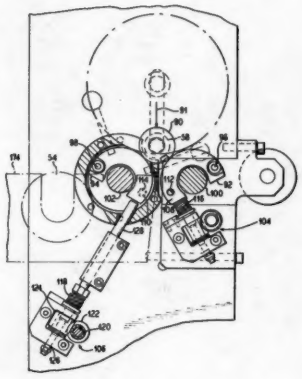
PRINTING STATION WITH TOOLLESS CHANGEABLE PLATE CYLINDER

Bohdan Washchynsky, Boca Raton, and Vladimir J. Fisher, Coral Springs, both of Fla., assignors to Webtron Corporation, Ft. Lauderdale, Fla.

Filed Jul. 21, 1987, Ser. No. 76,181

Int. Cl.[4] B41F *5/24, 13/44*

U.S. Cl. 101—219 30 Claims



1. A printing station for use in a printing press comprising:

support means for providing a frame;

first means on said support means for holding an impression roll;

second means on said support means for holding an anilox roll;

first adjustable means on said support means for positioning a plate cylinder relative to said impression roll;

second adjustable means on said support means for positioning said plate cylinder relative to said anilox roll;

releasable means for retaining said plate cylinder in a predetermined position relative to said impression roll and said anilox roll, said releasable means operable to allow removal and insertion of said plate cylinder without changing a setting of said first and second adjustable means;

each of said first and second adjustable means having an adjustable mechanism and a bearer having a pivot end attached to said support means and a free end, said bearer having at least a curved surface for contacting an end region of said plate cylinder, said adjustable mechanism having a moveable member contacting said free end of said bearer, wherein said moveable member causes said free end of said bearer to move pivoting said bearer about said pivot end thereby adjusting the position of said plate cylinder;

said bearer also having an aperture in its free end within which a stationary pin is located, said pin being connected to said support means, said pin and aperture providing a predetermined gap therebetween.

4,878,428

CONTROL METHOD OF TRANSPORTING A CUT SHEET IN A PRINTING STATION AND AN APPARATUS USING THE SAME

Shinichi Watarai, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Aug. 10, 1988, Ser. No. 230,612

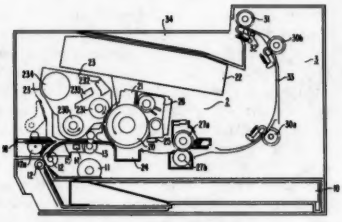
Claims priority, application Japan, Aug. 12, 1987, 62-201140

Int. Cl.[4] B41F *1/54*

U.S. Cl. 101—484 25 Claims

1. A control method for transport means transporting a cut

sheet in a printing station, wherein said printing station comprises a printing unit, a first transport means for transferring the cut sheet along a first passage from a first storing position of cut sheets to said printing unit, a second transport means for transferring the cut sheet along a second passage from said printing unit to a second storing position by ejecting the cut sheet, and a first detector means for detecting a jamming of the cut sheet along said first passage, said control method comprising the sequential steps of:



(a) detecting the sheet jamming along said first passage by using said first detector means;

(b) stopping said first transport means when the sheet jamming is detected by said first detector means and continuing operation of said second transport means at least until cut sheets remaining along said second passage are ejected into the second storage position; and

(c) stopping said second transport means after the cut sheets remaining along said second passage are ejected into the second storing position.

4,878,429

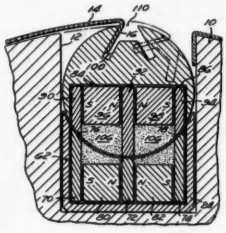
MAGNETIC ROTARY LOCKING MECHANISM AND METHOD

Alberto Russo, Buena Park, Calif., assignor to Nu-Graphics Engineering, Inc., Huntington Beach, Calif.

Filed May 26, 1988, Ser. No. 199,156

Int. Cl.[4] B41F *27/00*

U.S. Cl. 101—486 **13 Claims**



1. The method of applying tension to an object comprising the steps of:

securing a restrained object to a rotatably mounted member; and

magnetically urging said member to rotate in a direction such that said urging applies tension to said object, wherein said object is a printing plate wrapped onto the periphery of the cylinder in a rotary printing press, and said member is a bar mounted in a groove in the periphery of the cylinder, and wherein said securing step includes attaching a free end to said plate to said bar and including the step of releasing said bar after said securing step to allow said bar to be magnetically rotated in said direction to apply tension to said plate, thereby locking the plate into position.

4,878,430

DETONATOR PELLET

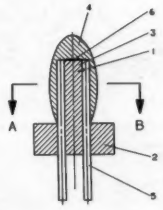
Gottfried Senkowski, Troisdorf, and Joachim Sturm, Lohmar, both of Fed. Rep. of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

Filed Oct. 7, 1988, Ser. No. 254,877

Claims priority, application Fed. Rep. of Germany, Oct. 20, 1987, 3735405

Int. Cl.[4] F42C *19/12*

U.S. Cl. 102—202.9 **6 Claims**



1. A detonator pellet comprising a base with two electrical contact members and a pole member, an ignition bridge connected to the contact members being attached to the topside of said pole member, and said pole member being surrounded by an initiator mixture in droplet shape; said base and said pole member being integrally formed of a composite insulating member exhibiting enhanced adhesiveness for the initiator mixture; said contact members comprising wires extending all the way through said composite insulating member to the ignition bridge and being supported by the composite insulating member.

4,878,431

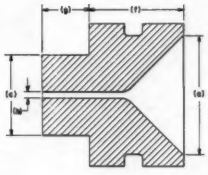
ELASTOMERIC INSULATING MATERIALS FOR ROCKET MOTORS

Liles G. Herring, Waco, Tex., assignor to Hercules Incorporated, Wilmington, Del.

Filed Feb. 21, 1986, Ser. No. 832,110

Int. Cl.[4] C06D *5/06*

U.S. Cl. 102—290 **14 Claims**



1. A method of insulating a rocket motor case which comprises (a) providing a compound comprising 100 parts by weight of a crosslinkable, substantially saturated elastomeric polymer; about 5–50 parts by weight of a crosslinkable, substantially unsaturated elastomeric polymer; about 5–85 parts by weight of a polyaramide pulp; about 0–120 parts by weight particulate selected from inorganic and organic particulates and about 1–15 parts by weight peroxide crosslinker and combinations thereof; (b) forming a ribbon by extruding or calendaring said compound; and (c) winding said ribbon around a workpiece having a central longitudinal axis so as to adjacently

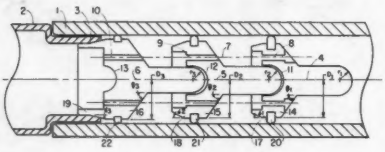
position and tack together integral segments of said ribbon around said axis.

4,878,432

MULTISTAGE KINETIC ENERGY PENETRATOR

Ameer G. Mikhail, Bel Air, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 29, 1988, Ser. No. 238,960
Int. Cl.[4] F42B *1/02*
U.S. Cl. 102—309 **8 Claims**



1. A multistage kinetic energy projectile comprising:

a primer case having forward and rearward ends;

a plurality of sequentially separable kinetic energy penetrators longitudinally stacked one onto the other, said plurality of penetrators having a forward leading penetrator and a rearward trailing penetrator secured to the forward end of said primer case;

means for fixidly interconnecting said plurality of kinetic energy penetrators; and

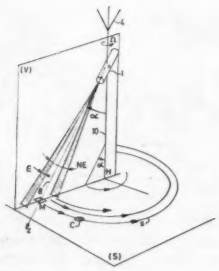
means for separating said plurality of kinetic energy penetrators from one another in sequence along a segment of said multistage kinetic energy projectile's flight path so that said plurality of penetrators fly independently and in spaced relation to one another along the flight path before impact with a target, whereby upon the leading penetrator reaching the target the trailing penetrators will follow onto the target in succession.

4,878,433

DEVICE FOR NEUTRALIZING MILITARY OBJECTS

Claude Pirolli, Rueil-Malmaison, France, assignor to Telecommunications Radioelectriques et Telephoniques, Paris, France

Filed Apr. 12, 1983, Ser. No. 485,517
Claims priority, application France, May 12, 1982, 82 08273
Int. Cl.[4] F42B *25/02*
U.S. Cl. 102—384 **3 Claims**



1. A device for neutralizing military objects by launching a mother rocket above the said objects and releasing an assembly of sub-munitions towards elementary targets which are mobile on the ground and are distributed in large numbers over an extended area, each of the said sub-munitions having a military charge capable of being fired and each sub-munition being suspended from an aircraft in such a position that the sub-munition's firing axis forms a constant angle with the vertical comprising:

means ensuring the sub-munition's substantially uniform rotational movement about the vertical axis passing through its suspension point from the aircraft in such manner that, when said aircraft has a substantially uniform vertical descending movement, the firing axis effects a spiral scanning of the ground so as to search for a target;

means for detecting the said target constituted by a sensor having a narrow field of view, comprising one or several detectors and an optical system orienting and concentrating the radiation of the detected target on the detectors;

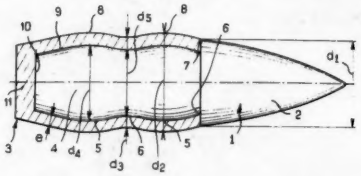
the firing on said military charge being initiated when a detection of the target is effected at an amplitude lower than a limit imposed by the range of the military charge, characterized in that the said optical system of the sensor comprises a deviator of low inertia interposed on the sensor's optical path and activated during the detection phase by a periodic oscillatory movement in such manner as to control the direction of the optical axis between two limited positions, the movement of the said deviator superimposed upon the uniform rotational movement of the sub-munition about its vertical axis scanning a circular area on the ground in each oscillation period and the said deviator being maintained in a fixed position so that the optical axis of the sensor is substantially parallel to the firing axis during the last phase of operation of the device corresponding to firing the military charge at the detected target.

4,878,434

PENETRATING PROJECTILE WITH HARD CORE AND DUCTILE GUIDE AND METHOD OF MAKING IT

Pierre Sommet, Sucy en Brie, France, assignor to Societe Francaise de Munitions, Paris, France

PCT No. PCT/FR88/00064, § 371 Date Oct. 6, 1988, § 102(e) Date Oct. 6, 1988, PCT Pub. No. WO88/06266, PCT Pub. Date Aug. 25, 1988
PCT Filed Feb. 5, 1988, Ser. No. 275,134
Claims priority, application France, Feb. 11, 1987, 8701691
Int. Cl.[4] F42B *11/08*
U.S. Cl. 102—514 **6 Claims**



1. A penetrating projectile of a caliber no more than 40 mm, the projectile including a core **(1)** having a front point **(2)**, the core being composed of a hard and high density metallic material and having a portion **(4)** to the rear of the point surrounded by a guide **(3)** having a generally cylindrical wall of ductile metal, the metallic material of the core being harder than the metal of the guide and the portion of the core which is surrounded by the guide being provided with projections **(5)** and depressions **(6)** and the guide being crimped onto said portion of the core by radial compression such that the internal surface of the guide is fixed axially and rotationally to said portion of the core by means of the projections and depressions, wherein the improvement comprises:

the guide **(3)** is crimped onto said portion **(4)** of the core **(1)** by electromagnetic forming and

the projections and depressions on said portion **(4)** of the core comprise undulations **(5,6)**, the internal surface of the guide **(3)** in contact with said portion of the core assuming the profile of the undulations **(5,6)**, and the external sur-

face of the guide (3) reproducing the profile of the undulations (5,6).

4,878,435

MOBILE TIE EXCHANGE MACHINE ARRANGEMENT

Josef Theurer, Vienna, Austria, assignor to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Filed Feb. 7, 1989, Ser. No. 307,825

Claims priority, application European Pat. Off., Jun. 28, 1988, 88890168-3

Int. Cl.[4] E01B *27/11, 27/13*

U.S. Cl. 104—9 10 Claims

1. A mobile machine arrangement for exchanging old ties for new ties in a track consisting of two rails fastened to ties and supporting the machine arrangement for mobility in an operating direction, which comprises

(a) a first machine unit leading in the operating direction,

(b) a second machine unit trailing in the operating direction,

(c) a drive for propelling each machine unit independently along the track in the operating direction,

(d) an operator's cab for each machine unit, each machine unit comprising

(1) a bridge-like machine frame,

(2) a tie loading car coupled to the machine frame and

(3) undercarriages supporting the machine frame and the tie loading car on the track,

(e) a tie exchange device for laterally pulling a respective one of the old ties out of the track mounted on the machine frame of the first machine unit,

(f) a tie exchange device for laterally inserting a respective one of the new ties into the track mounted on the machine frame of the second machine unit, each tie exchange device comprising

(1) power-driven vertically and longitudinally adjustable tie gripping means,

(g) a control for the tie exchange device mounted on each machine unit, and

(h) a tie transport arrangement mounted on the machine frame and tie loading car of each machine unit.

4,878,436

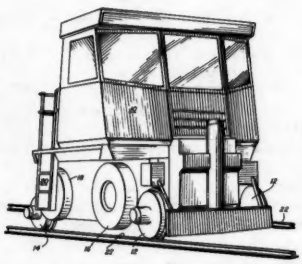
RAILCAR MOVING VEHICLE

Richard L. Lich, Newnan, Ga., and Robert L. Siewert, Loudon, Tenn., assignors to Trackmobile, Inc., LaGrange, Ga.

Filed Apr. 29, 1988, Ser. No. 161,964

Int. Cl.[4] B61C *11/00*

U.S. Cl. 105—72.2 4 Claims



1. A railcar moving vehicle of the type having a two-piece oscillating frame including a first relatively long main frame at the forward end of the vehicle and a second relatively short pivotable frame at the rear end of the vehicle which is pivotally movable relative to said main frame about a generally longitudinal axis, said vehicle having four driven rail wheels for operating on rail and four road wheels for operating on the road, said road wheels being movable between lower operative positions and raised inoperative positions, the improvement comprising, in combination, a front railwheel axle mounted on said main frame adjacent the forward end thereof and carrying the front two of said railwheels, a second railwheel axle mounted on said pivotable frame adjacent the rear end thereof and carrying the rear two of said railwheels, a first pair of said road wheels comprising non-driven, steerable road wheels mounted on said main frame rearwardly of said front rail wheels and mounted for pivotal movement between said lower and raised positions about a road wheel pivot axis located rearwardly of said steerable road wheels, first hydraulic cylinder means mounted on said main frame for lowering and raising said steerable road wheels, a second pair of said road wheels being mounted on said pivotable frame forwardly of said rear wheels and driven from said rear rail wheel axle, said second pair of road wheels being mounted for pivotal movement between said lower and raised positions about the axis of said rear railwheel axle, and second hydraulic cylinder means mounted on said pivotable frame for raising and lowering said second pair of road wheels.

4,878,437

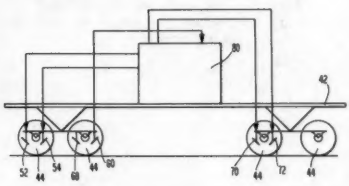
HOT BEARING SIMULATOR

Larry F. Myers, Altoona; Douglas B. Tharp, Exton, and Ralph H. Holl, Hollidaysburg, all of Pa., assignors to Consolidated Rail Corporation, Philadelphia, Pa.

Filed Mar. 17, 1988, Ser. No. 169,864

Int. Cl.[4] B61K *9/06*

U.S. Cl. 105—451 14 Claims



1. An apparatus for dynamically simulating the presence of a hot bearing on railroad rolling stock in order to verify the operation of hot box detectors comprising:

a moveable carriage having at least a first axle;

left heater means associated with said first axle for simulating a hot bearing on the left side of said first axle;

right heater means associated with said first axle for simulating a hot bearing on the right side of said first axle;

means for sensing the ambient temperature; and

means for controlling the temperature of each heater means to first predetermined temperature above ambient.

4,878,438

PORTABLE CONSOLE AND ARM REST APPARATUS

Donnie R. Carver, 178 Forest Retreat Rd., Hendersonville, Tenn. 37075

Filed Mar. 20, 1989, Ser. No. 325,900

Int. Cl.[4] A47B *23/00*

U.S. Cl. 108—44 9 Claims

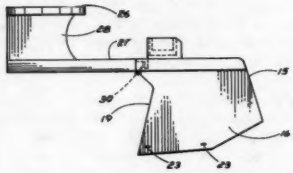
1. A console and arm rest apparatus for use in a vehicular interior containing a longitudinal housing hump and at least one seat wherein said seat includes an underlying seat support of a predetermined length measured forwardly from an upwardly extending seat back rest, said apparatus comprising,

a console and an elongate arm rest selectively securable to said console;

said console including a horizontal support surface disposed below a horizontal rim, and

a right and left side wall sloping outwardly with respect to right and left side portions of said horizontal rim, and

a forward wall joining forward edges of said right and left side walls sloping outwardly with respect to said forward portion of said horizontal rim terminating in a first arcuate recess underlying said rim, and



a rear wall extending downwardly from a rear portion of said horizontal rim joining rear edges of said right and left side walls terminating in a second arcuate recess, and

wherein said first and second arcuate recesses are aligned with one another to accommodate said housing hump, and

said elongate arm rest including attachment means securable to engagement members formed in said rear portion of said horizontal rim to secure said arm rest coextensively and rearwardly of said console.

4,878,439

EXTENDABLE TABLE

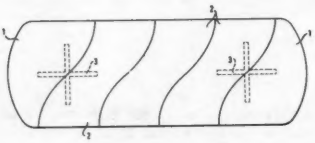
Ilan Samson, Rehov Eshkol 62, Tel-Aviv, Israel

Filed Sep. 28, 1984, Ser. No. 655,710

Claims priority, application Israel, Sep. 30, 1983, 69877

Int. Cl.[4] F16B *12/26*

U.S. Cl. 108—83 **10 Claims**



1. A table comprising a table top consisting of at least two table top elements, wherein each table top element and a next adjacent table top element fit together along a respective abutment line, wherein pedestal means is provided for directly supporting at least one but not all of the table top elements, wherein each said respective abutment line comprises a non-straight line, wherein at least three pairs of cooperating interfitting male and female members are provided at each said respective abutment line and are disposed at spaced apart locations in a non-collinear arrangement along said respective abutment line, with one member of each pair being located at one of said table top elements and the other member of the pair being located at said adjacent table top element, for connecting together each table top element and the next adjacent table top element, said pairs of cooperating members forming the sole means of support for table top elements not provided with a pedestal, whereby the weight of a table top element not provided with a pedestal is carried by shear stresses in the cooperating members and by bending stresses in the table top element itself.

4,878,440

METHOD AND PLANT FOR THERMAL WASTE DISPOSAL

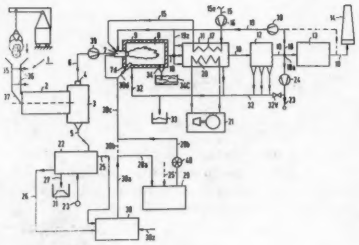
Herbert Tratz, Ottensoos; Klaus Riedle, and Georg Loesel, both of Uttenreuth, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed May 31, 1988, Ser. No. 200,646

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1987, 3725704; Apr. 8, 1988, 3811820

Int. Cl.[4] F23B *7/00*

U.S. Cl. 110—233 **29 Claims**



1. Plant for thermal waste disposal, comprising a pyrolysis reactor converting waste into carbonization gas and substantially non-volatile pyrolysis residue, a discharge device connected to said pyrolysis reactor having a non-volatile pyrolysis residue outlet and a carbonization gas discharge fitting for removal of carbonization gas, a combustion chamber operated with an oxygen excess being connected to said carbonization gas discharge fitting for receiving the carbonization gas, a residue sorting device connected to said pyrolysis residue outlet of said discharge device for sorting out coarser coarse components substantially including non-combustible ingredients such as rocks, glass shards, broken porcelain, and metal parts, from combustible finer coarse components, a transport device connected to said residue sorting device for transporting the finer coarse components, a grinding apparatus having an inlet side connected to said transport device and a discharge side for feeding the finer coarse components to said combustion chamber after grinding, said combustion chamber having means for maintaining combustion gases produced from delivered combustible material for a sufficiently long time at a sufficient temperature level to produce molten slag, said combustion chamber having an outlet for removing the molten slag, means downstream of said outlet of said combustion chamber for cooling the molten slag into a glassified form, a flue gas line leading from said combustion chamber, and a chimney connected to said flue gas line.

4,878,441

APPARATUS AND PROCESS FOR GENERATING STEAM FROM WET FUEL

Rolf Ryham, Princeton, N.J., assignor to Ahlströmforetagen Svenska AB, Norrkoping, Sweden

Filed Aug. 11, 1988, Ser. No. 231,085

Int. Cl.[4] F23G *7/04*

U.S. Cl. 110—238 **19 Claims**

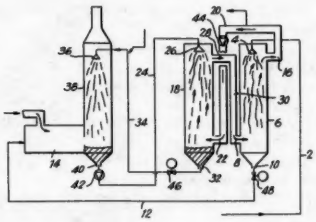
1. A process for generating steam from wet fuel comprising the steps of:

(a) evaporating water from said wet fuel by bringing said fuel into direct contact with superheated steam, whereby dried fuel and saturated steam are produced;

(b) superheating at least a portion of said saturated steam by bringing said steam into direct contact with a hot heat carrier, whereby a cooled heat carrier is produced;

(c) heating said cooled heat carrier by bringing said heat

carrier into contact with flue gases produced by burning said dried fuel from step (a); and



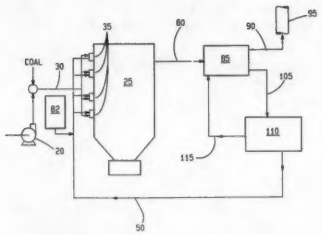
(d) using said heated heat carrier as the heating medium for said steam in step (b).

4,878,442

NOX CONTROL FOR HIGH NITRIC OXIDE CONCENTRATION FLOWS THROUGH COMBUSTION-DRIVEN REDUCTION

James T. Yeh; James M. Ekmann; Henry W. Pennline, all of Bethel Park, and Charles J. Drummond, Churchill, all of Pa., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Jun. 17, 1988, Ser. No. 207,995
Int. Cl.[4] F23J *11/00, 15/00*
U.S. Cl. 110—345 **29 Claims**



1. A method of removing nitrogen oxides from industrial waste gas streams containing high concentrations of nitrogen oxides, or from regenerable flue gas cleanup processes, comprising the steps of:

providing a combustor for particulate carbonaceous material, said combustor having primary and secondary oxidant inlets;

mixing a primary oxidant with said particulate carbonaceous material, said mixture being stoichiometrically deficient in oxidant;

injecting said mixture of primary oxidant and particulate carbonaceous material into a primary oxidant-carbonaceous material injection location;

mixing a combustible reductant with the nitrogen oxides and injecting the mixture of combustible reductant and nitrogen oxides into said primary oxidant-carbonaceous material injection location; and,

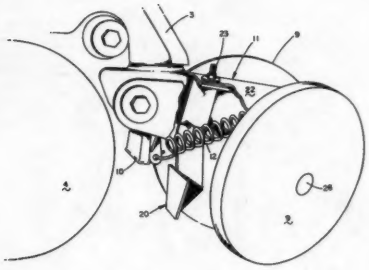
igniting said primary oxidant, particulate carbonaceous material, combustible reductant and nitrogen oxides in said primary oxidant -carbonaceous material injection location.

4,878,443

PLANTER TRASH GUARD

Donald Gardner, Rt. 1, Box 5, St. Peter, Minn. 56082

Filed Jul. 22, 1988, Ser. No. 223,082
Int. Cl.[4] A01C *5/06*
U.S. Cl. 111—141 **6 Claims**



1. A surface debris deflector for soil tillage apparatus including at least one pair of disk member cooperatively mounted in spaced apart relation to one another to rotate on edge as said apparatus travels over the soil, said debris deflector comprising:

(a) a planar body portion having side edges which vertically align in substantially parallel relation to an edge profile exhibited by said disk members relative to a line of apparatus travel over the soil; and

(b) a vertical support portion including means for mounting said body portion in centered relation to said disk members and to suspend said body portion immediately above the soil and forward of the rotational axis of said pair of disk members such that surface debris encountered by said body portion is prevented from entering the space between said disk members.

4,878,444

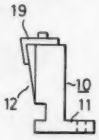
ELECTRONIC SEWING MACHINE AND PRESSER FOOT PARTICULARLY FOR BUTTONHOLE STITCHES AND PROCESS FOR PRODUCING BUTTONHOLE STITCHES UTILIZING ALTERNATELY OPERABLE SENSOR

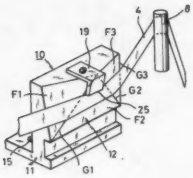
Yasuro Sano, 1601-2, Narahara-cho, Hachioji, Tokyo; Akio Koide, 1-11-4, Honda, Kokubunji, Tokyo; Toru Hyodo, Matsue-jutaku 4-209, 1923-1, Suwa-cho; Fumihiko Kobayashi, 1-26-14, Nakanokami-cho, both of Hachioji, Tokyo; Takayuki Kawasato, Room 303, 971-1, Nobe, Akikawa, Tokyo, and Yasuhiko Osanai, 4-4-302, 1097, Tate-machi, Hachioji, Tokyo, all of Japan

Filed Apr. 29, 1988, Ser. No. 188,011
Claims priority, application Japan, Apr. 30, 1987, 62-104698; Apr. 30, 1987, 62-104699; Apr. 30, 1987, 62-63989[U]
Int. Cl.[4] D05B *3/06*
U.S. Cl. 112—264.1 **11 Claims**

8. A process for producing buttonhole stitches with an electronic sewing machine wherein plural series of stitch control data for the buttonhole stitches are sequentially read out from a memory unit to control a needle amplitude and a fabric feeding amount, one series of the stitch control data being set to the next series when a longitudinal end of the buttonhole is

detected with sensor means, the improvement in which operation of said sensor means is annulled during stitching of portions of bar tacks produced at both longitudinal ends of the buttonhole.



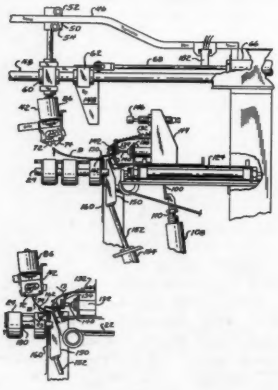


4,878,445

HEMMER SEAMER ASSEMBLY

Maximilian Adamski, Palatine; Robert L. Kosrow, Hoffman Estates, and Stephen Ruderman, Oak Park, all of Ill., assignors to Union Special Corporation, Chicago, Ill.

Division of Ser. No. 162,919, Mar. 2, 1988, Pat. No. 4,800,830.
This application Oct. 11, 1988, Ser. No. 256,028
Int. Cl.[4] D05B *27/00*
U.S. Cl. 112—311 **8 Claims**



1. A device for transporting a fabric to a sewing station, comprising:

a transort assembly including clamp means for gripping a portion of the frabic;

means for placing the fabric at a location for gripping by the clamp means;

means for adjusting the placing means;

means for moving the transport assembly towards the sewing station;

means for stopping movement of the transport assembly adjacent the sewing station; and

means for sensing the leading edge of the fabric when the transport assembly is stopped by the stopping means to verify the adjusting means is properly adjusted.

2. A device for transporting a fabric to a sewing station; comprising:

a transport assembly including clamp means for gripping a portion of the fabric;

means for placing the fabric at a location for gripping by the clamp means;

means for moving the transport assembly towards the sewing station;

means for sensing the leading edge of the fabric adjacent the sewing station; and

means reponsive to the sensing means for stopping movement of the transport assembly.

3. A device for transporting a fabric to a sewing station, comprising;

a support surface;

a transport assembly comprising, support means, clamp means located above the support surface, means for pivotally mounting the clamp means to the support means, and means for moving the support means between a first position with the clamp means spaced from the support surface and a second position adjacent the support surface;

means for placing a portion of the fabric beneath the clamp means; and

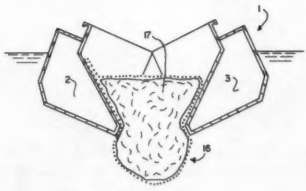
means for moving the clamp means toward the sewing station while the clamp means is in the second position gripping the fabric.

4,878,446

METHOD FOR THE FORMING AND THE DEPOSITION IN A SELECTED PLACE OF A BULK

Jan Vermeulen, Delden, Netherlands, assignor to Nicolon B.V., Netherlands

PCT No. PCT/NL87/00031, § 371 Date Jun. 27, 1988, § 102(e) Date Jun. 27, 1988, PCT Pub. No. WO88/03583, PCT Pub. Date May 19, 1988
PCT Filed Nov. 11, 1987, Ser. No. 224,919
Claims priority, application Netherlands, Nov. 11, 1986, 8602859
Int. Cl.[4] H63B *35/30*
U.S. Cl. 114—27 **18 Claims**



1. A method for depositing in a selected location a bulk material consisting substantially of loose or lightly cohesive material such as sand or other ground material comprising, providing a tank, placing a sheet of material in said tank, placing loose or lightly cohesive material on said sheet until the tank is filled to a desired depth, connecting portions of said sheet to one another to form a substantially closed envelope around said bulk material, positioning the tank substantially above the location where the bulk material is to be deposited, and then removing the envelope from said tank and depositing the envelope with the bulk material therein at said location.

9. Apparatus for depositing in a selected location a bulk material consisting substantially of loose or lightly cohesive material such as sand or other ground material comprising in combination, an envelope containing bulk material therein, said envelope including a sheet of material, connecting means for connecting portions of said sheet to one another to form a substantially closed envelope surrounding the bulk material

therein, a tank supporting said envelope, means for moving said tank into position substantially above a location where bulk material is to be deposited, said tank including means for removing and depositing said envelope from said tank, whereby said envelope with the bulk material therein can be deposited at said location.

4,878,447

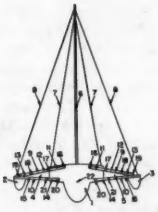
MULTIHULL VESSELS

John W. Thurston, 5313 S. 12th, Arlington, Va. 22204

Continuation-in-part of Ser. No. 27,208, Mar. 24, 1987, abandoned, which is a continuation of Ser. No. 751,382, Jul. 3, 1985, abandoned. This application Dec. 11, 1987, Ser. No. 132,068

Int. Cl.[4] B63B *43/14*

U.S. Cl. 114—61 **29 Claims**



1. A multihull vessel comprising:

a center section;

a plurality of float arm assemblies disposed on opposite sides of the center section and pivotably connected to the center section for movement between:

a first position laterally extended from the center section to increase the stability of the vessel in an upright position,

a second position located upwardly and inwardly from the first position above the center section and closely adjacent the vertical centerline of the vessel when the vessel is in an upright position, to decrease the stability of the vessel when the vessel is in a fully capsized position; and

a third position located downwardly and inwardly from the first position to reduce the beam of the vessel,

each float arm assembly including upper arm means and lower arm means pivotably connected to the center section for pivotal movement;

the upper arm means including inner and outer segment means pivotably connected together about a first intermediate pivot, the inner segment means including an inner end pivotably connected to the center section,

the lower arm means including inner and outer segment means connected together about a second intermediate pivot, the outer segment means of the lower arm means connected to a float and being pivotably connected to an outer end of said outer segment means of said upper arm means, the inner segment means of the lower arm means being pivotably connected to the center section,

the outer segment means of the upper arm means being rotatable relative to the inner segment about the first intermediate pivot to shorten the effective length of the upper arm means as the float arm assembly is moved between its first and second positions,

the outer segment of the lower arm means being rotatable relative to the inner segment about the second intermediate pivot to shorten the effective length of the lower arm means as the float arm assembly is moved between its first and third positions, and

actuating means for pivoting the float arm assembly, comprising:

lifting means for moving the float arm assembly from its first portion to its second position comprising a rigging line extending between the center section and to one of said outer segments at a location adjacent said float, the line disposed below the first intermediate pivot and above the second intermediate pivot and arranged such that the lifting force applied to said one outer segment has a larger component in the horizontal direction than in the vertical direction,

a lowering means for moving the float arm assembly from its first position to its third position, the lowering means extending between the upper and lower arm means and connected to the upper arm means,

means for tensioning the rigging line for effecting movement of the float toward the center section when not opposed by the lowering means,

means for tensioning the lowering means for reducing the separation between the upper and lower arm means when not opposed by the lifting means, and

the rigging line engaging an underside of the first intermediate pivot to resist downward movement of the latter as the float assembly is being maintained in its first position.

4,878,448

WISHBONE BOOM MOUNTING FOR SAILBOARDS

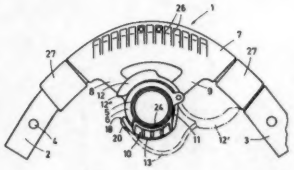
Udo Schütz, Rückersteg 4, D-5418 Selters, Fed. Rep. of Germany

Filed Jul. 11, 1988, Ser. No. 217,224

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1987, 8709564[U]

Int. Cl.[4] B63B *15/00*

U.S. Cl. 114—98 **7 Claims**



1. In a wishbone boom mounting for sailboards with a wishbone head section of a synthetic resin, integrally molded onto a curved pipe section for attaching the two spars of a wishbone boom, and a jacket section accommodating the curved pipe section, a collar connected to the jacket section by at least one web and being placeable onto the mast, a locking element being articulated to this collar and having an inner contour that matches the outer contour of the mast, and a quick-action closure for closing and opening the locking element in order to mount the head section to the mast and, respectively, for detaching the head section from the mast; the improvement comprising a hinged cover (**10**) molded onto the collar (**6**) of the wishbone head section (**1**) by way of a thin flexible hinge (**11**) and having an inner contour that matches the outer contour of the mast (**5**), as well as a clamping lever (**12**) articulated to the collar (**6**) for tightening and releasing a rope piece (**13**) forming a loop (**14**), one end of this rope piece being attached to the clamping lever (**12**) and the other end thereof being attached to the collar (**6**) in the region of the thin flexible hinge (**11**), the loop (**14**) of said rope piece being tensionable for attaching the wishbone head section (**1**) to the mast (**5**) by means of the clamping lever (**12**) by an extension (**20**) on the collar (**6**) lying opposite the closing rim (**19**) of the hinged cover (**10**), as well as by guides (**22, 23**) on the outside of the hinged cover (**10**).

4,878,449

SAFETY DEVICE FOR WATER SKIING

Stephan J. Smith, 15662 Park La., Livonia, Mich. 48154

Filed Dec. 1, 1988, Ser. No. 278,356
Int. Cl.[4] B63B *21/56*
U.S. Cl. 114—253 **5 Claims**

4. A safety release assembly for water skiing, said assembly comprising:

a tow harness member mounted across a rear transom of a boat,

a block-like means for mounting on the harness for slidable movement back and forth across the harness,

said block-like means having a spring-loaded means for engaging and pulling a ski rope which is held by a skier,

said spring-loaded means being held in fixed position during actual water skiing by,

a movable release member means which engages and holds the spring-loaded means in a closed condition during continued water skiing,

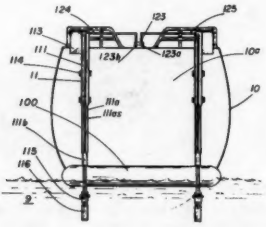
a triggering means attached to the movable release member means and operative substantially upon demand such that upon actuating said triggering means the release member means is disengaged from the spring-loaded means to thereby release the ski rope from any attachment to the boat.

4,878,450

BOAT LIFTING DEVICE

Anthony Schmidt, Jr., 3370 N. Key Dr., #1E, North Fort Myers, Fla. 33903

Filed Jun. 24, 1988, Ser. No. 211,241
Int. Cl.[4] B63B *21/00*
U.S. Cl. 114—259 **5 Claims**



1. A lifting device for boats, comprising in combination a plurality of support units, each said support unit comprising:

(a) a hollow vertical support member having a vertical slot;

(b) means for attaching said hollow vertical support member to another surface;

(c) motor means mounted on said hollow vertical support member;

(d) a vertical extension member movable up and down in said hollow vertical support member;

(e) cable means connecting said motor means to said extension member; and

(f) horizontal boat support means connected to said extension member through said slot;

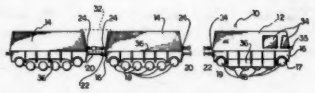
said vertical extension member comprising a hollow first member having a vertical slot and movable in said hollow vertical support member and a second member movable in said first member; said horizontal boat support means being anchored to said second member; said device being characterized in that actuation of said motor means selectively raises or lowers a boat position on said boat support means.

4,878,451

ALL-TERRAIN AMPHIBIAN VEHICLE

Andy O. Siren, 10011 Fairmount Drive, South East, Calgary, Alberta, Canada (T5J 0S6)

Filed Dec. 16, 1987, Ser. No. 133,732
Int. Cl.[4] B63B *35/00*
U.S. Cl. 114—270 **11 Claims**



1. An amphibious vehicle comprising:

a hull;

a plurality of wheels mounted on each side of the hull;

drive means including two drive trains for driving the wheels on respective sides of the hull and means for varying speeds of the drive trains in respect to one another;

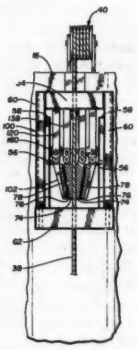
power take-off means including two power take-offs associated with respective ones of the drive trains at at least one end of the vehicle for driving connection to the respective drive trains of another, similar vehicle.

4,878,452

QUICK-RELEASE MOORING APPARATUS FOR FLOATING VESSELS

James B. Regan, Burnsville, Minn.; George J. Ikovich, Philadelphia, Pa.; James A. Carlsen, St. Paul, Minn.; Richard J. Juelich, Stillwater, Minn., and Henry G. Kogel, St. Paul, Minn., assignors to Amca International Corporation, St. Paul, Minn.

Continuation of Ser. No. 13,128, Feb. 10, 1987, abandoned. This application Feb. 13, 1989, Ser. No. 309,965
Int. Cl.[4] B63B *21/50*
U.S. Cl. 114—293 **24 Claims**



9. A platform-mounted apparatus for drawing in, holding, paying out and rapidly releasing a flexible load line having the properties of a wire rope comprising:

(a) winch means mounted to said platform, said winch means having the ability to draw in and hold the line up to a tensile force less than the breaking strength of the line; and

(b) wedge gripper means for holding said line by self-locking up to a tensile force substantially equal to the breaking strength of the line, said gripper means mounted to said platform and comprising:

(1) a pair of opposed grip wedges having opposed internal gripping surfaces for engaging the line and external

wedging surfaces that taper toward each other in the direction of tensile force in the line;

(2) of grip body having opposed seating surfaces against which the external wedging surfaces moveably bear, said seating surfaces tapering toward each other at substantially the same angle as the external wedging surfaces, said grip body and said grip wedges being relatively shiftable between a line engaging position wherein said grip wedges are received within the taper of the seating surfaces such that the opposed grip wedges are wedged together to engage the line for self-locking, and a line clearing position wherein said grip wedges move out of the taper of the seating surfaces such that the opposed grip wedges are moveable apart to disengage the line; and

(3) line release means operably connecting said grip body and said grip wedges to said platform for positively moving the grip body relative to the grip wedges to release self-locking by moving the grip body into said line clearing position while said grip wedges are limited in their travel relative to said platform.

4,878,453

INDICATING INSTRUMENT FOR AUTOMOTIVE VEHICLE

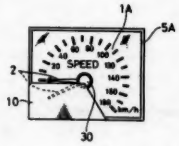
Tai Inoue; Masaya Sugita, both of Susono, and Keiji Okamoto, Shimada, all of Japan, assignors to Yazaki Corporation, Japan

Filed Mar. 15, 1988, Ser. No. 168,398

Claims priority, application Japan, Mar. 16, 1987, 62-037182[U]; Nov. 28, 1987, 62-174994[U]

Int. Cl.[4] G01D *13/04*

U.S. Cl. 116—288 **7 Claims**



1. An indicating instrument for an automotive vehicle, comprising:

(a) a dial for displaying pointer scale marks including:

(1) a black opaque layer in which pointer scale marks are engraved;

(2) a semitransparent layer; and

(3) a colored transparent layer sandwiched between said black opaque layer and said semitransparent layer

(b) a pointer for indicating on said dial a quantity measured;

(c) means for driving said pointer according to a quantity measured; and

(d) means, disposed on said dial means, for substantially covering said pointer when said means for driving said pointer is deactivated.

4,878,454

ELECTROSTATIC PAINTING APPARATUS HAVING OPTICALLY SENSED FLOW METER

Roger S. Cann, Mt. Clemens, Mich., assignor to Behr Industrial Equipment Inc., Rochester, Mich.

Filed Sep. 16, 1988, Ser. No. 245,683

Int. Cl.[4] B05C *11/00*

U.S. Cl. 118—663 **23 Claims**

1. A high-voltage electrostatic painting apparatus (10) of the type for coating an article (12) with any one of several colors of paint, said apparatus (10) comprising:

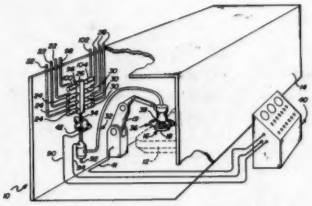
a spray booth (14);

discharge means (16) for discharging paint onto articles (12) on said booth (14);

fluid flow means (20) for conducting liquid paint from outside said booth (14) to said discharge means (16);

meter means (34) in said booth (14) for measuring the rate of flow of the paint through said fluid flow means (34);

electrostatic charging means (36) creating an electrical field within said booth (14) for establishing an electrical potential between said discharge means (16) and the article (12) to be painted;



master control means (40) outside said booth (14) for controlling the flow of liquid paint to the discharge means (16) thereby controlling the painting of articles (12) in said booth (14);

and characterized by including optical sensing means (42) responsive to the flow rate measurements of said meter means (34) for sending an optical signal from said meter means (34) to said master control means (40) for controlling the flow of liquid paint whereby the electrical field created by said electrostatic charging means (36) in said booth (14) will not adversely affect a reading of the paint flow rate measurement at said master control means (40).

4,878,455

DEVICE AND METHOD FOR SUPPLYING, VERY ACCURATELY METERED, A QUANITITY OF FOOD TO SMALL LIVESTOCK

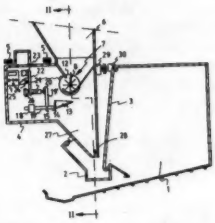
Harry M. van der Veer, Heerde, Netherlands, assignor to Farmtec B.V., Heerde, Netherlands

Filed Nov. 18, 1987, Ser. No. 122,173

Claims priority, application Netherlands, Nov. 18, 1986, 8602925

Int. Cl.[4] A01K *5/00*

U.S. Cl. 119—57.5 **4 Claims**



1. An animal feeding device comprising a frame movable along a sequence of cages disposed side-byside each having a feeder and comprising a food hopper having a discharge orifice, means in said discharge orifice for supplying food therefrom, a receiving trough in said frame below said discharge orifice and disposed to receive food supplied therefrom, said receiving trough being movable into a dumping position, means for retaining said receiving trough in a position to receive said supplied food, means for indicating when said re-

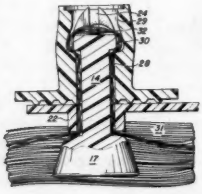
ceiving trough has received a predetermined quantity of food corresponding to the quantity of food desired for each animal multiplied by the number of animals within a said cage, means responsive to said indicating means for stopping the supply of food to said receiving trough, and means for actuating said retaining means such that said receiving trough moves to the position to dump food into said feeder, said indicating means comprises a bar having one end connected to said frame and a second end, said receiving trough being retained against said second end of said bar, and a strain gauge mounted on said bar to emit a signal corresponding to the degree of bending of said bar as an indication of the weight of food in said receiving trough.

4,878,456

ANIMAL TAIL TAG FOR INSECTICIDE PROTECTION

Steve R. Howe, Glendale, Ariz., assignor to An-Tech International Livestock Products, Phoenix, Ariz.

Filed Oct. 2, 1987, Ser. No. 103,906
Int. Cl.[4] A01K *13/00*
U.S. Cl. 119—156 **8 Claims**



1. Apparatus for attachment to the hair of an animal which comprises:

(a) an engaging member for gathering a multiplicity of strands of animal hair, said member including:

I. a stem having first and second ends;

II. limit means affixed to the second end of said stem;

III. a head affixed to the first end of said stem and having a cross-sectional area greater than said stem, the head containing at least one transverse slot recessed therein for gathering strands of animal hair, said at least one slot extending partially through the head;

(b) an elongated member having a passage therethrough for receiving and surrounding the stem and head of said engaging member, said passage containing regions of large and small cross-sectional areas for receiving adjacent portions of said slotted head and stem respectively; and

(c) retention means including a transition region contained in said elongated member and extending between said regions of large and small areas whereby the urging of said head and gathered strands through the small area region results in the frictional engagement of said strands between the elongated member and the engaging member within said transition region.

4,878,457

ZERO FLASH CLOSED CONDENSATE BOILER FEEDWATER SYSTEM

Martin Bekedam, 103 Brookline, Moraga, Calif. 94556

Filed Oct. 17, 1988, Ser. No. 258,827
Int. Cl.[4] F22D *1/28, 1/32, 1/40*
U.S. Cl. 122—441 **7 Claims**

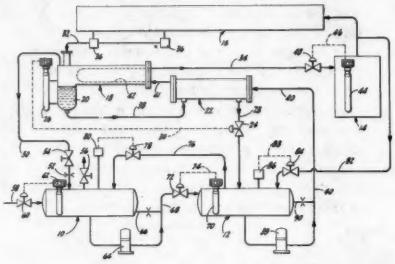
1. A steam processing system having a closed condensate return system for collecting condensate from processing equipment and returning it to a boiler feedwater system comprising:

a boiler;

a boiler feedwater system having a low pressure receiver means for receiving condensate and storing boiler feedwater, and a feedwater delivery means for supplying feedwater from the receiver means to the boiler;

processing equipment that receives high pressure steam from the boiler, the processing equipment having collection means for collecting condensate from spent boiler steam;

a pressurized flash condenser connected to the processing equipment for receiving mid pressure condensate from the processing equipment, the flash condenser having a surge tank means for collecting condensate and a cooling means



for circulating cooling water to condensate flash steam from condensate entering the flash condenser under varying pressure, wherein the cooling means of the flash condenser includes a cooling conduit through which the feedwater delivery means supplies feedwater from the receiver means to the boiler;

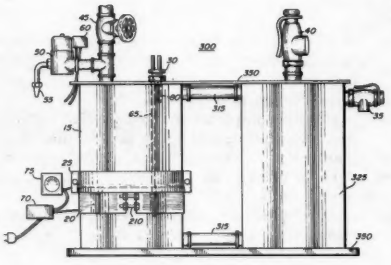
and, condensate return means for delivering condensate from the flash condenser to the receiver means according to the level of collected condensate in the flash condenser surge tank means.

4,878,458

METHOD AND APPARATUS FOR GENERATING PRESSURIZED FLUID

Clinton D. Nelson, 2910 Frontenac, North Chicago, Ill. 60606

Filed Aug. 31, 1987, Ser. No. 91,505
Int. Cl.[4] F22B *5/02*
U.S. Cl. 122—4 A **14 Claims**



1. An apparatus for generating pressurized fluid at elevated temperatures, said apparatus comprising:

a plurality of tanks housing fluids at elevated temperatures and pressures;

heating means for externally heating at least one tank and heating the fluid housed in said at least one tank to elevated temperatures and pressures;

heat sink means provided between each of said plurality of tanks to transfer heat from said at least one externally heated tank to the other said plurality of tanks;

temperature control means for controlling said heating means to heat the fluid housed in said at least one tank to

temperatures sufficient for providing fluids at elevated temperatures and pressures; and

fluid level sensing means for sensing the level of fluid in said at least one tank and deactivating said heating means when the level of fluid in said tank is below a preselected amount.

4,878,459

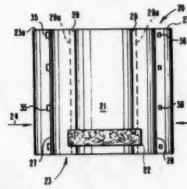
WATER HEATER CONSTRUCTION

Thomas E. Nelson, 2407 Greten La., Anchorage, Ky. 40223

Filed Feb. 13, 1989, Ser. No. 309,658

Int. Cl.[4] F22B *37/36*

U.S. Cl. 122—494 **12 Claims**



1. A water heater comprising:

a generally cylindrical inner water tank; and

a generally cylindrical outer insulation panel disposed circumferentially around said water tank, said insulation panel including:

(a) a flexible cover having two oppositely disposed, axially extending free ends which are joined together to complete said generally cylindrical shape and said flexible cover having an inside diameter size greater than the outside diameter size of said water tank;

(b) insulation means received by said flexible cover, and having a thickness at least equal to the distance of radial separation between said tank and said cover; and

(c) said cover further includes a skin and a plurality of generally parallel axially extending and inwardly directed ribs joined to said skin, each pair of adjacent ribs defining a receiving channel and each receiving channel having a portion of said insulation means disposed therein.

4,878,460

INTAKE SYSTEM FOR V-TYPE INTERNAL COMBUSTION ENGINE

Hiroyasu Uchida, Hiroshima, and Kazuhiko Ueda, Higashihiroshima, both of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Oct. 31, 1988, Ser. No. 264,651

Claims priority, application Japan, Oct. 30, 1987, 62-273363

Int. Cl.[4] F02B *25/28*

U.S. Cl. 123—52 MV **14 Claims**

1. An intake system for a V-type internal combustion engine comprising:

(a) an engine having elongated first and second banks set at an angle to each other to define a V-shaped space therebetween, each bank including a plurality of cylinders not intended to be fired one after another, and intake ports for the cylinders provided in the side of the bank facing toward the V-shaped space;

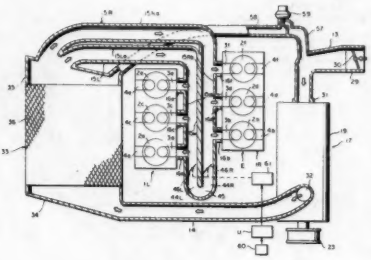
(b) a supercharger means positioned in the V-shaped space for feeding supercharged air to the cylinders;

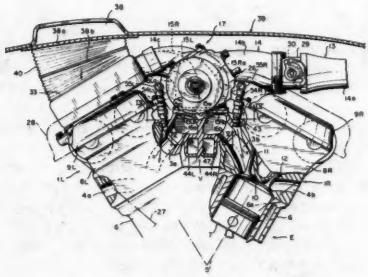
(c) intercooler means coupled to said supercharging means for receiving cooling supercharged air from the supercharger means, said intercooler means being positioned above the first bank;

(d) first and second intake collecting passages located in the V-shaped space below the supercharger means for receiving cooled air from the intercooling means and feeding same as intake air to the first and second banks, respectively;

(e) a first branch intake passage coupling the first intake collecting passage with the intercooler means;

(f) a second branch intake passage coupling the second intake collecting passage with the intercooler means;





(g) a plurality of first separate intake passages coupling the first intake collecting passage with the intake ports of the cylinders constituting the first bank; and

(h) a plurality of second separate intake passages coupling the second intake collecting passage with the intake ports of the cylinders constituting the second bank.

4,878,461

VARIABLE CAMSHAFT TIMING SYSTEM

Samuel J. Sapienza, IV, Hampton; Willem N. J. van Vuuren, Williamsburg; Benjamin G. Shirey, Hampton, and Russell J. Wakeman, Newport News, all of Va., assignors to Siemens-Bendix Automotive Electronics L.P., Troy, Mich.

Continuation-in-part of Ser. No. 181,867, Apr. 15, 1988, which is a continuation of Ser. No. 17,670, Feb. 24, 1987, Pat. No. 4,744,338. This application Jun. 30, 1988, Ser. No. 213,651

Int. Cl.[4] F01L *1/34*

U.S. Cl. 123—90.15 **8 Claims**

1. A variable timing system in combination with an internal combustion engine having an engine crankshaft or moveable member, an exhaust camshaft mounted for rotation and extending from the engine, said exhaust camshaft having at least one exhaust cam for controlling the opening and closing of at least one exhaust valve, and an intake camshaft mounted for rotation on the engine, said intake camshaft having at least one intake cam for controlling the opening and closing of at least one intake valve, said system comprising:

a first pulley wheel means fixedly attached to one end of each of the exhaust camshaft and the crankshaft of the engine;

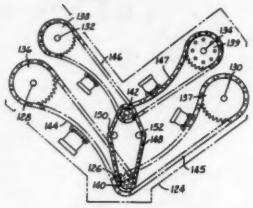
a first belt means for interconnecting said first pulley wheel

means for transferring rotational drive from the crankshaft to the exhaust camshaft;

a second pulley wheel means fixedly attached to each of the exhaust camshaft and one end of the intake camshaft at opposite end of the engine;

a second belt means for interconnecting said second pulley wheel means for transferring rotational drive from the crankshaft via the exhaust camshaft to the intake camshaft;

idler arm means including a pivoting arm, a cam follower means and an idler wheel in operative contact with a portion of said second belt means;



positioning cam means operatively coupled to said cam follower means of said idler arm means, for relatively rotating said second pulley wheel means attached to said one end of the intake camshaft with said second pulley wheel means attached to said opposite end of the exhaust camshaft;

a control means responsive to various engine operating parameters for generating motor control signals; and

motor means responsive to said motor control signals and operatively coupled to rotate said positioning cams means for positioning said idler arm means for changing the relative rotational position between the input camshaft and the exhaust camshaft.

4,878,462

ENGINE VALVE OPERATING APPARATUS

Toru Kurisu, Hiroshima, and Tuneo Kodama, Higashihiroshima, both of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

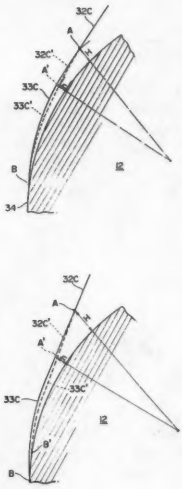
Filed Feb. 2, 1988, Ser. No. 151,667

Claims priority, application Japan, Feb. 5, 1987, 62-26070

Int. Cl.[4] F01L *1/08*

U.S. Cl. 123—90.17 **19 Claims**

1. An engine valve operating apparatus for a multi-cylinder internal combustion engine comprising a camshaft having a plurality of cams each of which has a cam lobe consisting of a cam nose section, opening and closing flank sections disposed on opposite sides of said cam nose section for opening and closing an engine valve associated with each said cam, and ramp sections connecting said opening and closing flank sections to a base section of said cam, respectively; and a plurality of journals formed between said plurality of cams through which said camshaft is mounted on said engine for rotation, said plurality of cams including an outermost cam which is located outside an outermost journal of said plurality of jour-



nals and has a closing ramp height higher than any opening and closing ramp height of any one of the remaining cams.

4,878,463

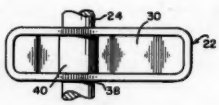
NEEDLE BEARING ROCKER ARM ASSEMBLY

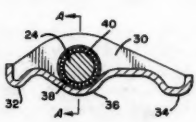
Arnold E. Fredericksen, New Hartfort, and Robert D. Richtmeyer, Goshen, both of Conn., assignors to The Torrington Company, Torrington, Conn.

Filed Oct. 1, 1987, Ser. No. 103,988

Int. Cl.[4] F01L *1/18*

U.S. Cl. 123—90.41 **6 Claims**





1. A rocker arm assembly for a rocker shaft comprising:

a rocker arm having an open-topped tub-like body;

said body further comprising a central pivot portion,

said pivot portion having a bottom wall and side walls,

said bottom wall having a semi-cylindrical extending bottom surface of a diameter greater than the rocker shaft, and

said side walls having coaxial bores of a diameter equal to the rocker shaft; and

a bearing adapted to fit in the interior of said pivot portion, said bearing having an outer portion radially in contact with said bottom surface and axially constrained by said side walls.

4,878,464

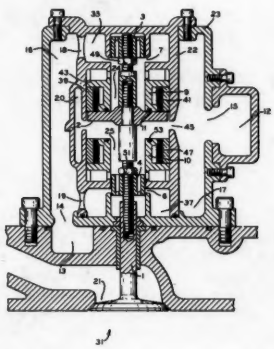
PNEUMATIC BISTABLE ELECTRONIC VALVE ACTUATOR

William E. Richeson, Jr., and Frederick L. Erickson, both of Fort Wayne, Ind., assignors to Magnavox Government and Industrial Electronics Company, Fort Wayne, Ind.

Filed Feb. 8, 1988, Ser. No. 153,257

Int. Cl.[4] F01L *9/04, 9/02*

U.S. Cl. 123—90.11 **15 Claims**



6. A bistable electronically controlled pneumatically powered transducer having an armature reciprocable between first and second positions, motive means for causing the armature to move, a permanent magnet latching arrangement for holding the armature in either one of said positions, and an electromagnetic arrangement for temporarily neutralizing the effect of the permanent magnet latching arrangement to release the armature to move from one of said postions to the other of said positions.

4,878,465

CONTROL FOR AUTOMATICALLY STARTING A DIESEL ENGINE

Jay L. Hanson, Bloomington, and Leland L. Howland, Belle Plaine, both of Minn., assignors to Thermo King Corporation, Minneapolis, Minn.

Filed Aug. 26, 1988, Ser. No. 236,887

Int. Cl.[4] F02N *11/08*

U.S. Cl. 123—179 BG **13 Claims**

1. Electrical control apparatus for automatically starting a Diesel engine, comprising:

a starting solenoid,

glow plugs,

a fuel solenoid,

start, preheat and run relays having switch contacts connected to respectively control the energization of said starting solenoid, glow plugs, and fuel solenoid,

a control module for controlling the energization of said start, preheat and run relays following energization of the control module,

and means for energizing said control module when the Diesel engine is to be automatically started,

said control module including:

first logic means for controlling said preheat relay,

said first logic means energizing the preheat relay when said control module is energized, to initiate energization of said glow plugs,

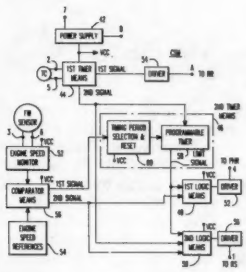
first timer means for providing a glow plug preheat time related to the temperature of the Diesel engine,

said first timer means providing a first signal for energizing the run relay prior to the completion of the preheat time, to energize the fuel solenoid, and a second signal at the completion of the preheat time,

second logic means for controlling said start relay,

said second logic means being responsive to the second signal of said first timer means, energizing the start relay in response thereto, to energize the starting solenoid,

monitor means for monitoring the speed (RPM) of the Diesel engine,



comparator means responsive to said monitor means for providing first and second signals at first and second predetermined RPM's, respectively,

second timer means responsive to the second signal of the first timer means and to the first signal of the comparator means for providing a limit signal,

said second timer means providing the limit signal after a first predetermined period of time, in the absense of the first signal, of the comparator means,

said second timer means providing the limit signal after a second predetermined period of time upon receipt of the first signal prior to the end of said first predetermined period of time,

said first and second logic means being responsive to said limit signal and to the second signal of said comparator means,

said first and second logic means respectively de-energizing the preheat relay and the start relay in response to the first to occur of said limit and second signals.

4,878,466

PISTON OF AN INTERNAL COMBUSTION ENGINE

Nikolai M. Storchevoi, Bratislavskaya, 34, kv. 174, Kiev, U.S.S.R.

PCT No. PCT/SU87/00032, § 371 Date Oct. 28, 1988, § 102(e) Date Oct. 28, 1988, PCT Pub. No. WO88/07132, PCT Pub. Date Dec. 22, 1988

PCT Filed Mar. 19, 1987, Ser. No. 283,483

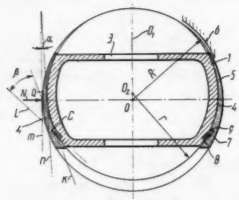
Claims priority, application U.S.S.R., Nov. 15, 1982, 3514116; Canada, May 11, 1987, 536,779; China, May 15, 1987, 87103522

Int. Cl.[4] F02F *3/08*

U.S. Cl. 123—193 CP **1 Claim**

1. A piston of an internal combustion engine comprising a skirt (1) with a hole (3) to receive a piston pin the axis (O_1) of which is perpendicular to the axis (O) of the skirt (1) the side surface of which is provided with two recesses (4) arranged at

the opposite sides of the piston pin hole axis (O_1) and having cylindrical surfaces with axes thereof parallel with the axis (O) of the skirt (1), each pin receiving an insert (5) having an outer cylindrical surface engageable with the surface of the cylinder (6) of the internal combustion engine, this outer cylindrical surface having a radius of curvature equal to the radius of the cylinder (6) of the internal combustion engine, and having an inner cylindrical surface of a radius of curvature of the recess (4), and two springs (7) each disposed between the corresponding insert (5) and skirt (1) for the force of the spring to urge the insert (5) to the cylinder (6), characterized in that cross-sectionally each insert (5) has the form of a curvilinear wedge



having a maximum angle not exceeding the angle of friction thereof, the inner surface of the insert (5) engaging with the cylindrical surface of the recess (4) the axis (0_2) of which is offset from the axis (O) of the skirt (1) axially of the piston pin hole axis (O_1) in the direction of taper of the wedge by a magnitude equal to the product of the radius (r) of curvature of the inner surface of the insert (5) by the maximum angle (α) of the wedge, each spring (7) being disposed so that the angle (β) between the direction of force produced by the spring (7) and a line (K) tangent to the inner surface of the corresponding insert at the point of application of this force toward the wedge taper is less than 90°.

4,878,467

SINGLE- OR MULTIPLE-PART PROTECTIVE COVER FOR TRACTION DRIVES

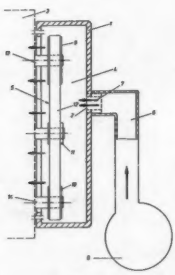
Konrad Schmidt, Ringstrasse 12, D-8501 Tuchenbach, Fed. Rep. of Germany

Filed Oct. 2, 1987, Ser. No. 103,717

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1986, 3631517

Int. Cl.[4] F01P *5/06*

U.S. Cl. 123—195 C **23 Claims**



1. A single- or multiple-part protective cover for traction drives, such as chain, belt, toothed belt drives, in particular for vehicle engines, vehicle drives, machines, comprising:

at least one inlet opening disposed in the protective cover, through which opening a gaseous medium can enter into an inner chamber containing the traction drive, the at least one inlet opening being designed as an over-pressure coolant inlet opening in a wall of the protective cover;

a line having one end connected with a corresponding one of the at least one inlet opening and having a second end connected to a source emitting the coolant medium, said source comprising a turbo-compressor.

4,878,468

COWL ASSEMBLY FOR AN OUTBOARD MOTOR

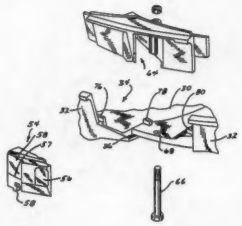
James C. Boda, Winneconne, and Gordon C. Slattery, Omro, both of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Division of Ser. No. 77,689, Jul. 24, 1987, Pat. No. 4,800,854.

This application Dec. 6, 1988, Ser. No. 280,684

Int. Cl.[4] F02F *7/00*

U.S. Cl. 123—195 P **7 Claims**



1. A cowl assembly for enclosing the engine of an outboard motor having an internal cable leading thereto, comprising:

a first cowl section and a second cowl section, said first and second cowl sections adapted to fit together to house said engine, said first and second cowl sections having edge portions which cooperate to form a joint between said cowl sections when said cowl sections are fitted together about said engine;

one of said cowl sections having a cut-out portion adjacent its edge portion forming an opening for allowing said cable to pass into the interior of said cowl assembly; and

sealing means for providing a water resistant seal around said cable at its point of entry into the interior of said cowl assembly, comprising:

a flexible plug adapted to surround said cable; and

an insert adapted for placement within said opening and including a passage adapted to receive said flexible plug for providing a water resistant seal at said opening about said cable.

4,878,469

POWER PLANT STRUCTURE FOR MOTOR VEHICLE

Yoshimasa Hayashi, Kamakura, and Tsuyoshi Tamazawa, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jan. 6, 1988, Ser. No. 141,244

Claims priority, application Japan, Jan. 7, 1987, 62-581

Int. Cl.[4] F02B *75/06, 75/20*

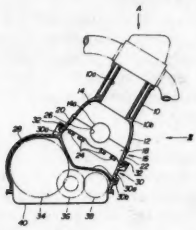
U.S. Cl. 123—195 A **13 Claims**

1. A power plant structure of increased rigidity and reduced engine noise comprising:

an engine including a cylinder block which includes a lower skirt;

a mounting portion integrally formed on said transmission case to which the lower skirt of said cylinder block is mounted;

connecting means for securely connecting said lower skirt of said cylinder block to said mounting portion; and



a part of said transmission case constituting a part of an oil pan of said engine upon mounting of said engine onto said mounting portion.

4,878,470

DEVICE FOR ACTUATING BUTTERFLY THROTTLE VALVE OF AN INTERNAL COMBUSTION ENGINE

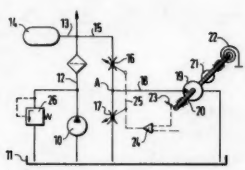
Rainer Burkel, Asberg; Kurt Engelsdorf, Besigheim; Rolf Gawlik, Beilstein, and Karl-Heinz Hägele, Vaihingen/Enz, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Oct. 13, 1988, Ser. No. 257,967

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 3736831

Int. Cl.[4] F02D *9/02*; F15B *1/02*

U.S. Cl. 123—401 **7 Claims**



1. A device for actuating a throttle valve of an internal combustion engine having a fuel pump and a throttle valve, said actuating device comprising:

hydraulic setting means coupled to the throttle valve for setting an operating position thereof in accordance with a nominal signal;

fuel flow control means connectable between the fuel pump and said hydraulic setting means for communicating to said hydraulic setting means a flow of fuel acting as a pressure medium; and

means for regulating said fuel flow control means in accordance with the nominal signal and including a position sensor for sensing the operating position of the throttle valve and for generating a position signal and an electronic control circuit connectable to said position sensor and a source of the nominal signal for generating a regulating signal in accordance with the position signal and the nominal signal;

said fuel flow control means comprising two adjustable throttles and said regulating means comprising adjusting means for simultaneously adjusting said two adjustable throttles in accordance with the regulating signal to provide for fuel flow to said hydraulic setting means in accordance with the nominal signal.

4,878,471

DIESEL FUEL INJECTION DEVICE WITH PREINJECTION

Peter Fuchs, Adlikon, Switzerland, assignor to Nova-Werke AG, Effretikon, Switzerland

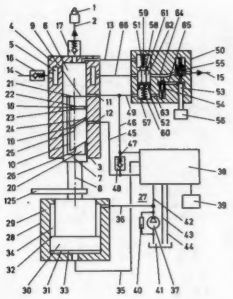
PCT No. PCT/CH87/00112, § 371 Date Jul. 8, 1988, § 102(e) Date Jul. 8, 1988, PCT Pub. No. WO88/02066, PCT Pub. Date Mar. 24, 1988

PCT Filed Sep. 4, 1987, Ser. No. 210,493

Claims priority, application Switzerland, Sep. 9, 1986, 03617/86

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—446 **16 Claims**



1. A fuel injection device for a diesel engine in which an injection nozzle is connected through a pressure line to an injector, which injector has a housing with at least one fuel line for the inflow and outflow of fuel, a pump chamber and a plunger, in which the plunger has at least one annular groove with two control edges and is fluidly connected with the pump chamber, and the housing has a corresponding relief passage for the interruption of pressure build-up in the pump chamber, with the distinction that the plunger (7) is connected with a fluid drive system (27) independent of the fuel system; said drive system (27) includes a drive unit (28), a pressure source (37), and a first control device (38) which ca be actuated mechanically and electrically, said first control device (38) including a main slide valve (70) and an auxiliary slide valve (71); said main and auxiliary slide valves each having a return piston (72, 74) acted on by fuel pressure from the pump chamber (6) through a respective line (45, 46); a second control device (50) being located in a fuel line (5, 15) on the injector (3) and includes an inlet relief valve (51) and at least one interruption valve (53), said inlet relief valve (51) having a switching piston (52) located in piston chamber (57) which is connected through a first line (49) with a first relief passage (11) on the injector housing (4) communicating with the pump chamber (6) and connected with the fuel line (15) through a second line (63, 65) having said interruption valve (53) located therein.

4,878,472

AIR-FUEL RATIO FEEDBACK CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

Yoshitaka Hibino, Wako, Japan, assignor to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Aug. 4, 1988, Ser. No. 228,545

Claims priority, application Japan, Aug. 31, 1987, 62-217252

Int. Cl.[4] F02M *17/00*

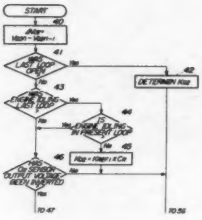
U.S. Cl. 123—489 **10 Claims**

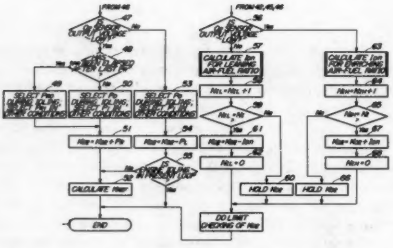
1. In a method of controlling the air-fuel ratio of a mixture being supplied to an internal combustion engine having an exhaust system, in a feedback manner responsive to an output signal from sensing means arranged in said exhaust system for sensing the concentration of a component in exhaust gases from said engine to produce as said output signal a normally

fluctuating output signal indicative of the concentration of said component, the method including:

comparing the value of said output signal with a predetermined reference value; and

controlling the air-fuel ratio of said mixture to a desired value by means of at least one of proportional control applying a first correction value to correct the air-fuel ratio when said output signal changes from a rich side to a lean side or vice versa with respect to said predetermined reference value, and integral control applying a second correction value to correct the air-fuel ratio with a predetermined period so long as said output signal remains





on the lean side or on the rich side with respect to said predetermined reference value,

the improvement comprising the steps of:

(1) sensing a rate of change in the value of said output signal;

(2) determining a correcting amount in response to the sensed rate of change; and

(3) increasing or decreasing said second correction value by means of said determined correcting amount, depending upon whether said output signal remains on the lean side or on the rich side with respect to said predetermined value.

4,878,473

INTERNAL COMBUSTION ENGINE WITH ELECTRONIC AIR-FUEL RATIO CONTROL APPARATUS

Shinpei Nakaniwa, and Akira Uchikawa, both of Kasukawa, Japan, assignors to Japan Electronic Control Systems Co. Ltd., Isesaki, Japan

Filed Sep. 28, 1988, Ser. No. 250,261

Claims priority, application Japan, Sep. 30, 1987, 62-243896

Int. Cl.[4] F02D *41/06*

U.S. Cl. 123—489 **18 Claims**

1. An electronic air-fuel ratio control apparatus in an internal combustion engine with a ternary catalyst disposed in an exhaust system which is effective in oxidation reaction of carbon oxide and hydro carbon and in reduction reaction of nitrogen oxides when an air-fuel mixture drawn into the engine is in a theoretical air-fuel ratio, which comprises:

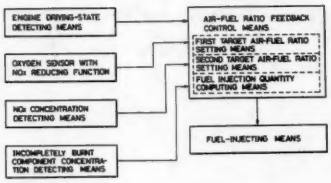
an engine driving state-detecting means for detecting a driving state of the engine;

a nitrogen oxides concentration detecting means for detecting nitrogen oxides concentration in the exhaust gas;

an incompletely burnt component concentration detecting means for detecting incompletely burnt component concentration including carbon oxide CO or hydro carbons HC in the exhaust gas;

an oxygen sensor disposed in the exhaust system of the engine to detect the air-fuel ratio of the air-fuel mixture through the oxygen concentration in the exhaust gas, said oxygen sensor comprising an oxidizing catalyst layer and a nitrogen oxides-reducing catalyst layer for promoting the reaction of reducing nitrogen oxides and emitting a voltage signal with the point of the theoretical air-fuel ratio corresponding to the oxygen concentration in the exhaust gas including the oxygen in the nitrogen oxides;

an air-fuel ratio feedback control means for controlling the air-fuel ratio of the air-fuel mixture by increasing or decreasing a fuel injection quantity to be supplied to the engine based on the engine driving state detected by said engine driving state-detecting means and the air-fuel ratio detected by said oxygen sensor so as to eliminate the deviation of the air-fuel ratio detected by said oxygen sensor from a target air-fuel ratio;


ENGINE DRIVING-STATE DETECTING MEANS
OXYGEN SENSOR WITH NOx REDUCING FUNCTION
NOx CONCENTRATION DETECTING MEANS
INCOMPLETELY BURNT COMPONENT CONCENTRATION DETECTING MEANS
AIR-FUEL RATIO FEEDBACK CONTROL MEANS
FIRST TARGET AIR-FUEL RATIO SETTING MEANS
SECOND TARGET AIR-FUEL RATIO SETTING MEANS
FUEL INJECTION QUANTITY COMPUTING MEANS
FUEL-INJECTING MEANS

a fuel-injecting means for injecting and supplying a fuel to the engine in an on-off manner according to a driving pulse signal emitted from said air-fuel feedback control means; and

said air-fuel ratio feedback control means in which the target air-fuel ratio has first and second target air-fuel ratios further comprising:

a first target air-fuel ratio setting means for setting the first target air-fuel ratio based on the engine driving state detected by said engine driving state detecting means and the air-fuel ratio detected by said oxygen sensor;

a second target air-fuel ratio setting means for changing the first air-fuel ratio to set the second target air-fuel ratio which is richer than the first air-fuel ratio when a high nitrogen oxides concentration is detected by said nitrogen oxides concentration detecting means or which is leaner than the first air-fuel ratio when a high incompletely burnt component concentration is detected by said incompletely burnt component concentration detecting means; and

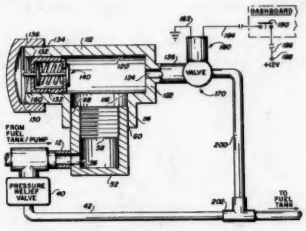
a fuel injection quantity computing means for computing and setting a fuel injection quantity to be injected from said fuel-injecting means to the engine to attain the first target air-fuel ratio or the second target air-fuel ratio of the air-fuel mixture based on the engine driving state, the air-fuel ratio of the air-fuel mixture, the nitrogen oxide concentration and the incompletely burnt component concentration.

4,878,474

VENT APPARATUS FOR FUEL INJECTION SYSTEM

J. Roy Hack, Jr., 5405 S. Rosemont, Tucson, Ariz. 85706

Filed Nov. 18, 1988, Ser. No. 272,902
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—516 **11 Claims**



1. In a fuel injection system having a fuel rail, a pressure relief valve connected to the fuel rail, a fuel return line extending from the pressure relief valve, and a bleed valve for bleeding air pressure from the fuel rail, including a valve housing connected to the fuel rail and a removable manually actuated valve core, the improvement comprising, in combination:

valve housing means connected to the valve housing for providing a manual bleed valve and a remotely actuable bleed valve;

means for receiving and connecting the manually actuated valve core in and to the valve housing means for providing a manual bleed valve; and

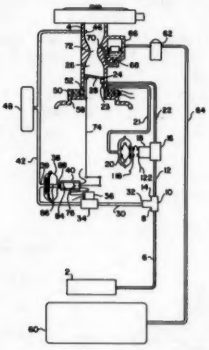
remotely actuable valve means connected to the valve housing means for remotely bleeding air pressure from the fuel rail.

4,878,475

FUEL SUPPLY SYSTEM FOR INTERNAL COMBUSTION ENGINES

Ludwig Birsa, 219 Fisher Ave., Rockdale, Ill. 60436

Filed Nov. 21, 1988, Ser. No. 274,233
Int. Cl.[4] F02B *1/00*
U.S. Cl. 123—525 **10 Claims**



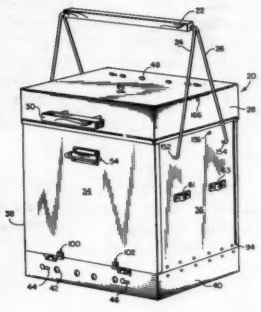
1. A fuel supply system for an internal combustion engine having at least one combustion chamber, comprising first fuel supply means to supply a first fuel to said combustion chamber for starting initial combustion therein, including said first fuel, and to continue to supply a limited amount of said first fuel to said combustion chamber throughout the entire operation of said engine until it is stopped, second fuel supply means to supply a second fuel to said combustion chamber during a specified and limited phase of said engine's operation, including said second fuel, acceleration means operative to begin supply of said second fuel to said combustion chamber after said initial combustion and to thereafter accelerate and decelerate supply of said second fuel to said combustion chamber, and third fuel suuply means to supply said first fuel to said combustion chamber from said third fuel supply means for a determinable limited time period in response to said acceleration means operating to accelerate supply of said second fuel to said combustion chamber, said first fuel and said second fuel being both supplied to said combustion chamber during such determinable limited period of time, said third fuel supply means discontinuing to supply said first fuel to said combustion chamber after such determinable limited period of time.

4,878,476

PORTABLE BARBECUE GRILL ASSEMBLY

Adam L. Oliphant, 1452 D Street, N.E., Washington, D.C. 20002

Filed May 22, 1989, Ser. No. 355,620
Int. Cl.[4] F24C *1/16*
U.S. Cl. 126—9 R **11 Claims**



1. A portable barbecue grill assembly capable of being folded into an attache carrying case configuration comprising:

a. rectangular top cover in the form of an attache case having four upstanding closed sides, a closed back and an open front, together with a grip handle affixed on one side;

b. a cooking oven supporting the top cover and including:

i. a rectangular base pan;

ii. left and right hand oven upstanding sides hingedly connected to said base pan and including interior bracket means for support of grills therebetween;

iii. an upstanding back hinged to said base pan and including interior bracket members for supporting cooking grills, and

iv. a front door releaseably and pivotally secured to said base pan, and

c. a plurality of cooking grates including side and back studs respectively engaging said bracket means in said sides and back.

4,878,477

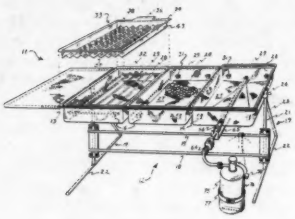
BARBEQUE GRILL WITH FLAMELESS HEATING ELEMENT AND HEAT RESTRICTIVE COOKING SURFACE

Jack S. McLane, 3101 Backman Rd., Gaston, S.C. 29503

Filed Apr. 22, 1988, Ser. No. 184,689
Int. Cl.[4] A47J *37/00*; F24C *3/04*
U.S. Cl. 126—41 R **14 Claims**

1. In a barbecue grill of the type having a housing defining an upper opening and a substantially rectangular grill supported a preselected distance below the upper opening with

the support grill comprising a plurality of substantially parallel rods, an improvement comprising a substantially rectangular pan adapted to be supported on said support grill, said pan being corrugated to form substantially parallel ridges and valleys with the spacing between adjacent ridges corresponding to the spacing between adjacent rods of the support grill, said valleys having a plurality of openings formed therein with



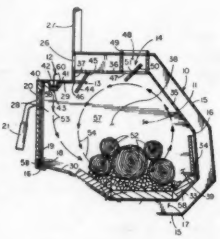
the openings sized to restrict egress of heat from within the housing, and means for producing heat within the housing, said pan further comprising two side members extending upwardly from opposite edges of the pan a distance substantially corresponding to said preselected distance, whereby the pan can be supported upon the food support grill with its side members extending upwardly adjacent the upper opening of the housing.

4,878,478

WOOD BURNING STOVE

Darrel Johnson, 320 - 11th St., Lewiston, Id. 83501

Filed Mar. 21, 1988, Ser. No. 170,804
Int. Cl.[4] F24C *1/14*
U.S. Cl. 126—61 **7 Claims**



1. A stove that circulates combustion gases in a horizontal cylindrical fashion to provide a longer dwell time in the fire chamber, comprising in combination:

an outer shell partially containing an inner shell, with door means in the inner shell at a spaced distance from the outer shell, to define a heat exchange chamber between the inner and outer shells, said heat exchange chamber having means to circulate air therethrough for heating;

a fire chamber defined by the inner shell and having a forward portion, a bottom portion extending rearwardly and below the forward portion in an angulated fashion, a rearward portion angled in an upward and forward direction, a forwardly extending substantially horizontal top plate and a forward vertical wall defining the aforesaid door means;

draft means defined in the top plate above and immediately rearwardly of the door means;

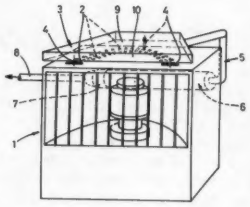
and flue means for exhausting combusion gases from the upper rearward part of the fire chamber defined a spaced distance forwardly of the rearward portion of the fire chamber.

4,878,479

APPARATUS FOR EXHAUSTING THE COMBUSTION GASES OF A STOVE FIRED ON LIQUID OR GASEOUS FUEL

Cornelis C. Stuitje, Johan van Oldenbarneveldlaan 27, 3705 HA, Zeist, Netherlands

Filed Sep. 6, 1988, Ser. No. 241,057
Claims priority, application Netherlands, Sep. 3, 1987, 8702075
Int. Cl.[4] F24C *15/20*
U.S. Cl. 126—84 **9 Claims**



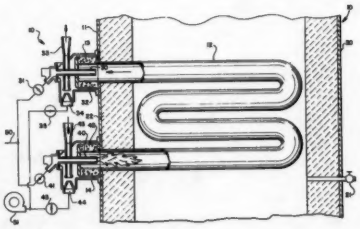
1. Apparatus for exhausting the combustion gases of a stove with open combustion fired on liquid or gaseous fuel, said stove having an upper wall with a plurality of combustion gas outlet means, said apparatus comprising a collector hood, having a closed upper wall and a downwardly directed open under side, means for detachably mounting the collector hood on top of the upper wall of the stove with its open under side covering said combustion gas outlet means, a heat exchanger, means connecting the heat exchanger to the collector hood, an exhaust tube for exhausting the combustion gases, and a fan for providing a flow of combustion gases from the collector hood through said connecting means and said heat exchanger to said exhaust tube.

4,878,480

RADIANT TUBE FIRED WITH TWO BIDIRECTIONAL BURNERS

James E. Watson, Southgate, Mich., and Theodore E. Davies, Hudson, Ohio, assignors to Gas Research Institute, Chicago, Ill.

Filed Jul. 26, 1988, Ser. No. 224,161
Int. Cl.[4] F24C *3/00*
U.S. Cl. 126—91 A **6 Claims**



1. An improvement for a radiant tube heating system having a bi-directional burner at the ends thereof, the bi-directional burners serving as burners for combustion air and discharge openings for products of combustion, the improvement com-

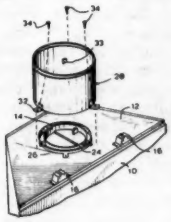
prising a first eductor, means to connect said first eductor to a first burner, said first eductor having a jet nozzle and a throat, a second eductor, means to connect said second eductor to a second burner, said second eductor having a jet nozzle and a throat, first means to operate the second burner and the jet nozzle of said first eductor pulling combustion air through said throat of said second eductor for firing said second burner while discharging the products of combustion thereof through said first eductor, second means to operate the first burner and the jet nozzle of said second eductor pulling combustion air through said throat of said first eductor for firing said first burner while discharging the products of combustion thereof through said second eductor and means to alternately selectively operate said first means and said second means to heat the radiant tube.

4,878,481

FIREPLACE HAVING CHIMNEY CONSTRUCTION INCLUDING COLD AIR BARRIER

Terry G. Schoeff, Andrews, and Rex A. Kaufman, Roanoke, both of Ind., assignors to Majco Building Specialites, L.P., Huntington, Ind.

Filed Jan. 9, 1989, Ser. No. 295,128
Int. Cl.[4] F23L *17/02*
U.S. Cl. 126—307 R **12 Claims**



1. A fireplace and chimney assembly comprising:

a fireplace housing including a top wall and an opening within said top wall;

a two wall chimney construction mounted to said top wall of said fireplace housing, said chimney construction including an inner cylindrical wall extending from said opening and an outer cylindrical wall positioned concentrically with respect to said inner cylindrical wall, said outer wall including a base portion positioned adjacent to said top wall of said fireplace housing;

an annular space defined by the inner surface of said outer wall and the outer surface of said inner wall;

means for introducing cooling air into said annular space near said base portion of said outer wall;

ceiling means positioned a selected distance above said top wall of said fireplace housing; and

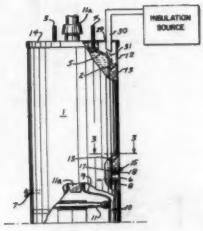
a shield including walls defining a bottom opening; a top opening, and a space extending between said bottom and top openings, said shield being mounted to said top wall of said fireplace such that said bottom opening is substantially sealed by said top wall, said shield walls including inner and outer surfaces, said outer surfaces of said shield walls being in substantially sealing engagement with said ceiling means; said inner surfaces of said shield and said outer surface of said outer wall defining a second space from which cooling air may be introduced into said annular space, said shield being substantially shorter in length than said inner and outer cylindrical walls.

4,878,482

INSULATED FLUID STORAGE UNIT AND METHOD OF MAKING

John D. Pfeffer, Brookfield, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Continuation-in-part of Ser. No. 28,475, Mar. 20, 1987. This application Apr. 15, 1988, Ser. No. 181,971
Int. Cl.[4] F24H *7/00*
U.S. Cl. 126—375 **24 Claims**



1. A liquid heating unit, comprising an inner tank extending along an axis, an outer shell spaced from said storage tank and defining a cavity between said opposed walls of said shell and tank, a bottom wall secured in said cavity between said shell and storage tank to define the bottom end of said cavity, said bottom wall including an essentially semi-rigid single support element of a high temperature insulation and having an extended surface parallel to said axis of said tank, said extended surface directly affixed to and abutting the tank, and said support element having an outer peripheral surface sealed to said shell, and a hardened insulation filling said cavity and defining a rigid insulation about said inner tank.

4,878,483

PLATE HEAT EXCHANGER AND HEATING STOVE WITH THE PLATE HEAT EXCHANGER

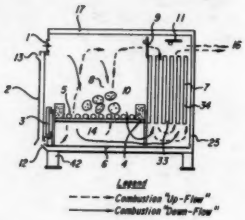
Zenon Todorski, 198 Westcroft Road, Beaconsfield, Quebec, Canada (H9W 2M3)

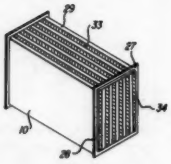
Filed Apr. 17, 1987, Ser. No. 40,571
Claims priority, application Canada, Sep. 4, 1986, 517462
Int. Cl.[4] F24B *7/00*
U.S. Cl. 126—523 **8 Claims**

1. A heating stove comprising: a combustion chamber, a grate for fuel disposed in the combustion chamber, upper and lower combustion air inlets to provide a bottom air feed upwardly through fuel from below the grate, and downwardly through fuel from above the fuel, a heat exchanger including a series of vertically oriented horizontally spaced metal plates means for interconnecting said plates to form a set of vertical passages conducting the products of combustion and a set of horizontal passages conducting a flow of air to be heated, top and bottom passageways above and below said series of plates through which the plates communicate with the combustion chamber, two flow control adjustable baffles above the plates in the top passageway, one of the baffles being disposed centrally of the series of plates, the other of the baffles controlling flow from the combustion chamber, and an outlet connecting a downstream end of the top passageway to a flue.

3. A heat exchanger, comprising: a series of vertically oriented, horizontally spaced metal plates, each of said plates having first mutually opposite unbent edges and second mutually opposite edges with flanges formed thereon protruding perpendicularly to said plates, said first and second opposite edges being alternating horizontal and vertical edges throughout said series of plates, each of said flanges having a U-shaped outer edge receiving an unbent edge of the adjacent plate, said plates being interconnected exclusively by direct engagement of said unbent edges with said U-shaped outer edges, and each of said flanges having notches formed therein defining a tail

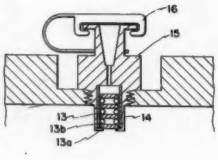
permitting attachment of said plates, said flanges spacing said plates apart to form a set of vertical passages conducting the





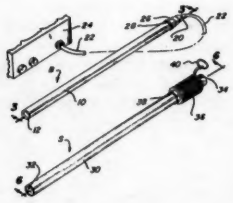
products of combustion and a set of horizontal passages conducting a flow of air to be heated.

4,878,484
WATER-TIGHT ENDOSCOPE
Kunihiko Miyagi, Tokyo, Japan, assignor to Machida Endoscope Co., Ltd., Tokyo, Japan
Filed Jul. 15, 1988, Ser. No. 219,251
Int. Cl.[4] A61B 1/00
U.S. Cl. 128—4 **5 Claims**



1. A water-tight endoscope comprising a flexible tube zone, a handle zone and a guide tube zone, the respective zones and connecting parts thereof having a water-tight structure, wherein an opening for connecting the interior of the endoscope to the outer air is formed in the guide tube zone and a waterproof and gas breathable filter is arranged in said opening to connect gas within the interior of the endoscope to the outer gas, said filter capable of being constantly open for passage of air into and out of the interior of said endoscope during all temperature stages of a disinfecting, temperature-related procedure.

4,878,485
RIGID VIDEO ENDOSCOPE WITH HEAT STERILIZABLE SHEATH
Edwin L. Adair, 2800 S. University Blvd., Denver, Colo. 80210
Filed Feb. 3, 1989, Ser. No. 306,815
Int. Cl.[4] A61B 1/00
U.S. Cl. 128—6 **13 Claims**



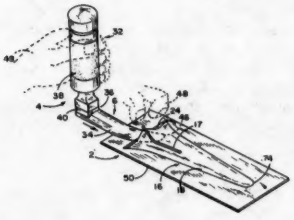
1. A rigid video endoscope comprising:
an inner cylindrical body member having a distal end and a proximate end;
a light transmitting element sealed to said distal end of said body member;
an image sensor mounted against said element within said body member;
an electronic cable within said body member, having a distal end connected to said image sensor and a proximate end extending beyond said proximate end of said body member and connectable to a video processing unit;
at least one fiber optic bundle within said body member, having a distal end adjacent said element and a proximate end extending beyond said proximate end of said body member and connectable to the video processing unit;
a strain relief fixture sealingly attached to said proximate end of said body member, said electronic cable and said fiber optic bundle extending through said fixture, said fixture being sealed thereto;
an outer cylindrical heat sterilizable sheath, having a distal end and a proximate end, for receiving said inner body member and being of substantially the same length as said body member;
a window sealed to said distal end of said sleeve;
an accordion-folded, heat sterilizable, cylindrical sleeve mounted adjacent said proximate end of said sheath and extendable along said electronic cable and said optical bundle for a substantial distance for maintaining sterility of said video endoscope within an operating room; and
means for releasably locking said body member within said sheath.

4,878,486
DISPOSABLE COVER ARRANGEMENT FOR LARYNGOSCOPES AND THE LIKE
William M. Slater, 6 N. Buys, Muskegon, Mich. 49445
Filed Jul. 13, 1987, Ser. No. 72,600
Int. Cl.[4] A61B 1/06
U.S. Cl. 128—110 **21 Claims**

14. A disposable cover for laryngoscopes of the type having an elongate blade with a contoured, channel-shaped guide surface on which an associated light source is mounted to facilitate inserting an endotracheal tube into the air passageway of a patient; said cover comprising:
a sheath having a sterile exterior surface, and a closed interior surface which defines a hollow cavity originally of a different three-dimensional shape than the shape of laryngoscope blades which it is intended to cover, said cover being adapted to receive and envelope a laryngoscope blade; said sheath having an open end adapted for insertion of a laryngoscope blade into the cavity of said sheath; said sheath being readily flexible and formable to conform

an associated portion of the same to the shape of a contoured guide surface of a laryngoscope blade, and being constructed from a light-transmitting material, such that light waves emitted from the light source are transmitted through the sheath to illuminate an air passageway of a patient;

retaining means for securely retaining the associated portion of said sheath closely against a contoured guide surface of laryngoscope blade, after selectively fitting said sheath on a laryngoscope blade, such that a view along an air passageway of the patient remains wholly unobstructed during insertion of an endotracheal tube, yet permits said



sheath to be manually stripped from a laryngoscope blade for disposal after a single use;

means for forming a seal between said sheath and a laryngoscope at a location adjacent to the open end of said sheath; and

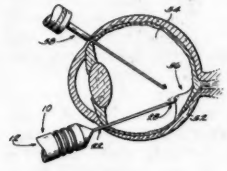
a tube connected with the interior surface of said sheath, and having an outer end disposed exterior to said seal means, and an inner end disposed within said sheath cavity interior to said seal means, whereby applying suction to the outer end of said tube evacuates the cavity of said sheath, and draws said sheath closely against a laryngoscope blade to define at least a portion of said retaining means.

4,878,487

ILLUMINATED TISSUE MANIPULATOR FOR OPHTHALMIC SURGERY

Kevin B. Sinnett, Mukwonago, Wis., assignor to Trek Medical Products, Inc., Oak Creek, Wis.

Filed May 26, 1988, Ser. No. 199,109
Int. Cl.[4] A61B *1/06*
U.S. Cl. 128—20 **7 Claims**



1. An illuminated instrument for manipulating vitreous tissue and the like comprising

a handpiece having first and second ends;

an elongated, rigid probe made from a substantially opaque material, extending from said first end of said handpice and including a tubular body having an outside dimension suitable for insertion through an opening in a patient's eye into the vitreous cavity thereof and terminating in a forward edge extending around a substantial portion of the outer periphery of said body and in a plane generally perpendicular to the longitudinal axis of said body, said body including an integral, narrow tissue manipulating tool extending longitudinally and outwardly beyond said forward edge;

an elongated fiber optic light-conducting member extending through said handpiece and said body, having a first end disposed adjacent said body forwrad edge and extending in a plane generally perpendicular to the longitudinal axis of said body and having a second end remote from said second end of said hand piece;and

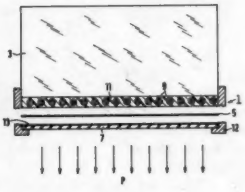
means connected to second end of said light-conducting member for receiving light from a light source for intraocular illumination whereby a beam of light from said source is directed outwardly through said forward end of said light-conducting member.

4,878,488

SHOCK WAVE TUBE WITH LONG SERVICE LIFE

Georg Naser, Zirndorf; Helmut Reichenberger, Eckental, and Karl-Heinz Schlee, Neunkirchen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 821,085, Jan. 21, 1986, abandoned. This application Mar. 17, 1988, Ser. No. 170,584
Claims priority, application Fed. Rep. of Germany, Jan. 28, 1985, 3502751
Int. Cl.[4] A61B *17/22*
U.S. Cl. 128—24 A **10 Claims**



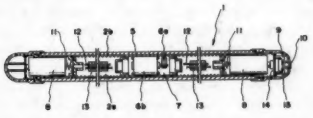
2. An improvement to a shock wave tube of the type which is used to destroy kidney stones and the like in vivo and which includes a coil, a coil carrier which carries the coil, and a diaphragm which is located in front of the coil and which produces shock waves in response to energizations and deenergizations of the coil, comprising a coil carrier of aluminum oxide ceramic.

4,878,489

MASSAGE UNIT

Yuzo Kamayachi, Tokyo, Japan, assignor to Tensho Electric Industrial Co., Ltd., Tokyo, Japan

Filed Jul. 11, 1988, Ser. No. 217,580
Int. Cl.[4] A61H *1/00*
U.S. Cl. 128—6 **5 Claims**



1. A massage unit comprising:

an elongated elastically deformable hollow cylinder;

vibrator means disposed in said elongated elastically deformable cylinder for producing vibrations for vibrating said elongated elastically deformable hollow cylinder;

switch means attached to said vibrator means for turning said vibrator means on and off; and

elastically deformable cylinder shape retaining means at-

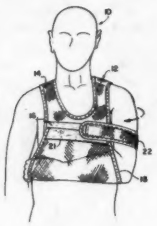
tached to and extending along substantially the entire length of said elongated elastically deformable hollow cylinder for retaining the cylindrical shape of said elongated elastically deformable hollow cylinder when said elastically deformable shape retaining means and said elongated elastically deformable hollow cylinder are bent to a desired shape, said elastically deformable cylinder shape retaining means being an elongated hollow cylindrical bellows disposed within said elongated elastically deformable hollow cylinder, and said elongated hollow cylindrical bellows being a synthetic resin material.

4,878,490

UNIVERSAL ORTHOPEDIC RECUPERATIVE GARMENT

James W. Scott, P.O. Box 7630, Tifton, Ga. 31794

Filed Jan. 27, 1989, Ser. No. 302,364
Int. Cl.[4] A61F *5/37*
U.S. Cl. 128—77 **14 Claims**



1. A universal orthopedic recuperative garment comprising:

a vest portion having,

a front vest panel operable to extend over a patient's chest and upper abdomen, and

a back vest panel joined to and substantially coextensive with said front vest panel, said front and back vest panels having a central opening operable to permit said vest to be fitted over the head of a patient such that said vest may be operably supported upon a patient's shoulders;

a generally rectangular retaining pad laterally extending across an upper portion of said front panel and being composed of one of a hook and pile type fastening material;

means connected to adjacent lateral edges of said front panel and said back panel for adjustably connecting said front and back panels substantially at lateral rib cage areas for securing said vest portion about the upper torso of a patient;

an arm support panel integrally joined at a bottom portion of said front vest panel, said arm support panel, having at a free end thereof, a transverse rectangular strip on each side of said free end is composed of one of a hook and pile type fastening material wherein a first transverse rectangular strip releasably connects to said generally rectangular retaining pad and a second opposed transverse rectangular strip forms an outwardly extending retaining surface in cooperation with said generally rectangular retaining pad composed of one of a hook and pile type fastening material thereby allowing said arm support panel to fold upwardly and transversely attach to said generally rectangular retaining pad mounted upon said front vest panel and to form from said front vest panel and said arm support panel a transversely extending channel for supporting a patient's forearm;

at least one retaining patch mounted upon an interior surface of said front panel and opposed to said generally rectangular retaining pad and being composed of one of a hook and pile type fastening material; and

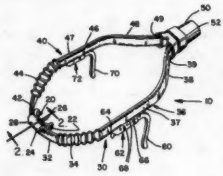
an upper arm rotating and binding strap having fastening patch at a first end composed of the other of a hook and pile type fastening material with respect to said one of said hook and pile type fastening material of said outwardly extending retaining surface of said generally rectangular retaining pad and said transverse rectangular strip and a fastening patch at a second end of said upper arm rotating and binding strip composed of the other of a hook and pile type fastening material with respect to said at least one retaining patch positioned on the interior surface of said front vest panel wherein a patient's recuperating hand, forearm, upper arm, shoulder, or the like may be operably supported by placing a patient's forearm in a generally horizontal posture within said transversely extending channel formed by said front vest panel and said arm support panel and the patient's upper arm is pulled forward and rotated by said arm rotating and binding strap extending from an interior portion of said front vest panel, around the upper humerus portion of patient's arm and connecting to said outwardly extending retaining surface formed upon said front vest panel of said universal orthopedic recuperative garment.

4,878,491

EXERCISE SNORKEL APPARATUS

Donald A. McGilvray, III, 70 Grace Ter., Pasadena, Calif. 91105

Filed Sep. 23, 1988, Ser. No. 248,385
Int. Cl.[4] B63C *11/16*
U.S. Cl. 128—201.11 **18 Claims**



1. An exercise snorkel apparatus comprising:

a. a mouthpiece having a gripping member, an internal chamber and an opening through the gripping member extending into the internal chamber;

b. a first hollow breathing tube connected to one side of the mouthpiece and in fluid communication with the internal chamber of the mouthpiece;

c. said first hollow breathing tube further comprising a hollow insert section which extends into one side of the mouthpiece, a hollow flexible bellows section which extends from the other side of the hollow insert section, and a hollow elongated section extending from the other side of the hollow flexible bellows section and further comprising a straight portion, an arcuate portion and a mating chamber portion;

d. a second hollow breathing tube connected to the opposite side of the mouthpiece and in fluid communication with the internal chamber of the mouthpiece;

e. said second hollow breathing tube being a mirror image of the first hollow breathing tube, and further comprising a hollow insert section which extends into one side of the mouthpiece, a hollow flexible bellows section which extends from the other side of the hollow insert section, and a hollow elongated section extending from the other side of the hollow flexible bellows section and further comprising a straight portion, an arcuate portion and a mating chamber portion;

f. the respective hollow insert sections extending away from each other and joining their respective hollow flexible bellows sections which extend along oppositely disposed arcuate routes; and

g. the respective arcuate portions of the respective hollow elongated sections extending along a joining arcuate path such that their remote ends lie adjacent each other and are joined together by a joining hollow collar such that the back opening of the breathing tubes extend out of the back opening of the joining hollow collar;

h. whereby the exercise snorkel apparatus may be held between the wearer's teeth and the exercise snorkel apparatus is positioned on the wearer's head such that the respective hollow flexible bellow sections are aligned around the side of the wearer's face, the straight portion of a respective one of the elongated hollow sections rests over a respective one of the wearer's ears, and the respective joined arcuate portions and joining hollow collar extend behind the wearer's head the exercise snorkle apparatus further including

a first adjustable mounting means affixed beneath the straight portion of the first hollow breathing tube;

a the first adjustable mounting means further comprising a hollow chamber and a wall having a multiplicity of mating members therein;

a first adjustable temple having a multiplicity of mating members thereon and insertable into the chamber of the first adjustable mounting means such that the temple can be adjustable to fit into one of the wearer's ears;

a second adjustable mounting means affixed beneath the straight portion of the second hallow breathing tube;

the second adjustable mounting means further comprising a hollow chamber and a wall having a multiplicity of mating members therein and;

a second adjustable temple having a multiplicity of mating members thereon and insertable into the chamber of the second adjustable mounting means such that the temple can be adjusted to fit the wearer's other ear.

4,878,492

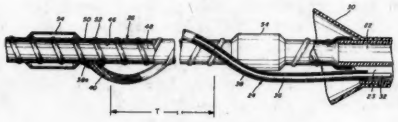
LASER BALLOON CATHETER

Edward L. Sinofsky, N. Reading, Mass.; J. Richard Spears, Bloomfield Hills, Mich.; Douglas W. Dickinson, Merrimack, N.H., and Maria S. Wagner, Reading, Mass., assignors to C. R. Bard, Inc., Murray Hill, N.J.

Filed Oct. 8, 1987, Ser. No. 106,609

Int. Cl.[4] A61B *17/36*

U.S. Cl. 128—303.1 **47 Claims**



1. A laser balloon catheter comprising:

an elongated flexible tube having a distal end and a proximal end;

an inflated balloon secured to said flexible tube at or near the distal end thereof;

means for inflating and deflating said balloon;

central shaft means disposed in said balloon and coupled to said flexible tube;

an optical fiber for carrying laser radiation through said flexible tube into said balloon; and

tip assembly means coupled to said optical fiber for directing laser radiation outwardly through a major portion of the balloon surface, said tip assembly means being located within said balloon between said central shaft means and the balloon surface and including means for limiting shadowing thereof by said central shaft means.

4,878,493

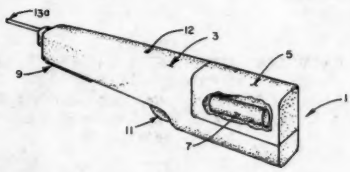
HAND-HELD DIATHERMY APPARATUS

Eliezer Pasternak; Robert C. Drews, and Tadmor Shalon, all of St. Louis County, Mo., assignors to Ninetronix Venture I, St. Louis, Mo.

Continuation of Ser. No. 546,571, Oct. 28, 1983, abandoned. This application Dec. 30, 1985, Ser. No. 815,661

Int. Cl.[4] A61B *17/39*

U.S. Cl. 128—303.14 **3 Claims**



1. A hand held, cordless diathermy apparatus for use in neurological and microsurgical applications comprising

an elongated housing shaped for manual support and manipulation during neurosurgery and microsurgery,

an electrical power supply within said housing,

radio frequency generating means within said housing and supplied with energy from said power supply for generating an oscillatory current,

at least one electrode extending from one end of said housing, and

switch means mounted to said housing near said one end and operable by a hand holding said apparatus during surgery, said switch means controlling the supply of said oscillatory current to said at least one electrode.

4,878,494

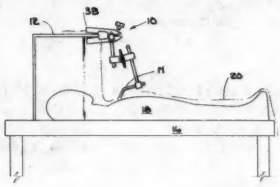
CARDIO-VALVE ASSIST UNIT AND METHOD FOR PERFORMING CARDIO-VALVE REPLACEMENT SURGERY

James L. Phillips; Dale W. Richardson, both Mattawan, Mich., and J. Donald Hill, San Francisco, Calif., assignors to International Research & Development Corporation, Mattawan, Mich.

Division of Ser. No. 176,030, Mar. 31, 1988, Pat. No. 4,834,097. This application Dec. 20, 1988, Ser. No. 287,400

Int. Cl.[4] A61B *17/04;* B25B *1/20*

U.S. Cl. 128—334 R **13 Claims**



1. A cardio-valve assist unit which comprises:

first clamp means adapted to be clamped in a fixed position relative to an operating table;

first arm means affixed to said first clamp means and rigidly projecting therefrom;

second arm means;

double-clamp means for connecting said second arm means to said first arm means;

said double-clamp means comprising two parts mounted for rotation one relative to the other, one of which is adapted to receive said first arm means for slidable movement therein and the other of which is adapted to receive said second arm means for slidable movement therein, and

clamping screw means adapted simultaneously to clamp said two parts on said arm means in any position to which they may be adjusted; and

third clamp means mounted on said second arm means for clamping a cardio-valve holding means to said second arm in rigid relation thereto;

whereby, when a cardio-valve holding means having a cardio-valve therein is clamped in said third clamp means, the cardio-valve can be placed in position for suturing into the heart and held firmly in that position until suturing is complete.

4,878,495

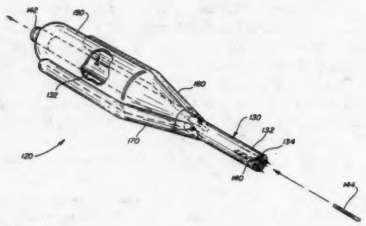
VALVULOPLASTY DEVICE WITH SATELLITE EXPANSION MEANS

Joseph Grayzel, 262 Fountain Rd., Englewood, N.J. 07631

Filed May 15, 1987, Ser. No. 50,741

Int. Cl.[4] A61M *25/00*

U.S. Cl. 128—344 **24 Claims**



1. A balloon catheter for valvuloplasty comprising:

a catheter portion having a plurality of flow passages therein;

primary expandable means coupled to a source of pressurized liquid;

auxiliary expandable means coupled to a source of pressurized liquid;

said auxiliary expandable means mounted circumferentially adjacent said primary expandable means with the axis of said primary and auxiliary expandable being displaced and capable of being expanded under control of said liquid supply separately and independently of the expansion of said primary expandable means and in substantially parallel relation to the primary expandable means said auxiliary expandable means being displaced laterally from the axis of said primary expandable means upon expansion of said primary expandable means.

4,878,496

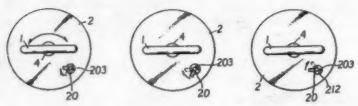
SELF-RETRACTABLE RUBBER NIPPLE

Bo-Zhou Chen, No. 130-18, Shih Lin Ts'un, Liu Ying Hsiang, Tainan Hsien, Taiwan

Filed Mar. 31, 1987, Ser. No. 32,463

Int. Cl.[4] A61J *17/00*

U.S. Cl. 128—360 **3 Claims**



1. A self-retractable rubber nipple particularly provided with a collapsible bellows-like element which is made in a cylindrical and hollow form with a plurality of pleats on the external surface thereof and mounted on the same side of a stop plate where a nipple member is placed; and an air volume control unit being provided on said stop plate by means of which air can be regulatively controlled so to determine the expanding speed of said bellows-like element, in such a manner said rubber nipple can be slowly automatically removed from a baby's mouth without its notice.

4,878,497

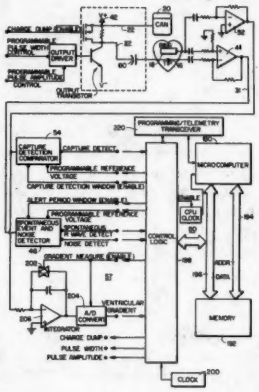
PACEMAKER WITH IMPROVED AUTOMATIC OUTPUT REGULATION

Francis J. Callaghan, Miami, and William Vollmann, Lauderhill, both of Fla., assignors to Telectronics N.V., Curacao, Netherlands Antilles

Filed Mar. 25, 1988, Ser. No. 173,566

Int. Cl.[4] A61N *1/00*; H05G *00/00*

U.S. Cl. 128—419 PG **17 Claims**



1. A rate-responsive pacemaker comprising means for sensing the presence of absence of an evoked potential; means for periodically ascertaining the value of a measured rate control parameter which is based upon the sensing of an evoked potential; means for generating pacing pulses at a pacing rate which is a function of said MRCP; and means responsive to the failure to sense an evoked potential following the generation of a pacing pulse for increasing the pacing rate so that if said failure was due to a fusion beat, then the next pacing pulse is more likely to result in a heart capture.

4,878,498

ELECTROCONVULSIVE THERAPY APPARATUS AND METHOD FOR AUTOMATIC MONITORING OF PATIENT SEIZURES

Richard Abrams, Chicago, and Conrad M. Swartz, Lake Forest, both of Ill., assignors to Somatics, Inc., Lake Bluff, Ill.

Continuation of Ser. No. 258,209, Oct. 4, 1988. This application Feb. 23, 1989, Ser. No. 313,906

The portion of the term of this patent subsequent to Oct. 7, 2006, has been disclaimed.

Int. Cl.[4] A61N *1/36*

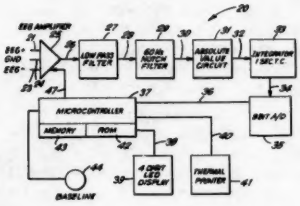
U.S. Cl. 128—419 S **12 Claims**

1. A method in electroconvulsive therapy (ECT) to monitor the termination of an induced seizure in a patient, the method including the steps of:

employing an ECT device, removably securing a plurality of electrodes on the head of the patient and applying

electricity through the electrodes in an electroconvulsive therapy session to induce seizure, and

detecting the electrical brain waves of the patient in an electroencephalographic (EEG) device by amplifying the brain waves detected by at least one electrode removably secured to the head of the patient; establishing and storing in system memory a baseline reference of a brain wave



parameter, detecting the patient brain waves to commence the monitoring of the termination of the seizure in the range of 1–30 seconds after ceasing the said application to induce seizure, automatically determining the termination of seizure as determined by the monitored brain wave parameter declining to the said established reference, and displaying said termination of seizure.

4,878,499

MAGNETIC RESONANCE IMAGING SYSTEM

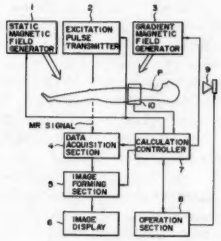
Hirokazu Suzuki, Ootawara; Yoshio Machida, Tochigi, and Yuji Yuasa, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 24,528, Mar. 11, 1987, abandoned. This application Oct. 11, 1988, Ser. No. 256,110

Claims priority, application Japan, Nov. 2, 1985, 60-247799

Int. Cl.[4] A61B *5/05*

U.S. Cl. 128—653 A **9 Claims**



1. In a magnetic resonance imaging system which comprises static magnetic field generation means for generating a static magnetic field, gradient magnetic field generation means for generating a gradient magnetic field, excitation means for applying an excitation pulse signal, data acquisition means for acquiring magnetic resonance data, image forming means for forming a magnetic resonance image based on the magnetic resonance data, and control means for controlling said static magnetic field generation means, said gradient magnetic field generation means, said excitation means, and said data acquisition means at a predetermined timing, and in which the static magnetic field is applied to an object to be examined, the gradient magnetic field and the excitation pulse signal are applied to the object to be examined in accordance with a predetermined pulse sequence, so as to cause a magnetic resonance phenomenon in a selected portion of the object to be examined, the magnetic resonance data of the magnetic resonance phenomenon is acquired by said data acquisition means, and the magnetic resonance image is obtained from the magnetic resonance data by said image forming means, the improvement comprising:

direction means for intermittently directing the object to be e..amined to keep still; and

acquisition control means for causing said data acquisition means to repeat a data acquisition operation a number of times for acquiring the magnetic resonance data necessary for reconstruction of the magnetic resonance image of the object to be examined, each data acquisition operation being performed only while said object remains still in response to said direction from said direction means, for collecting a predetermined quantity of magnetic resonance data, said predetermined quantity being set prior to the data acquisition in accordance with the duration in which the object to be examined remains still.

4,878,500

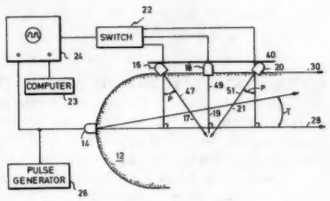
MULTI-BEAM TRACKING FOR ANGLE ERROR CORRECTION IN SPEED OF SOUND ESTIMATIONS

Jonathan Ophir, and David P. Shattuck, both of Houston, Tex., assignors to The University of Texas System, Austin and The University of Houston-University Park, Houston, both of, Tex.

Continuation-in-part of Ser. No. 887,349, Jul. 21, 1986, Pat. No. 4,807,635, and a continuation-in-part of Ser. No. 823,322, Jan. 28, 1986, Pat. No. 4,777,958, which is a continuation-in-part of Ser. No. 791,719, Oct. 28, 1985, Pat. No. 4,669,482. This application Jul. 13, 1988, Ser. No. 218,810

Int. Cl.[4] A61B *8/00*

U.S. Cl. 128—660.01 **15 Claims**



1. A method of correcting for angle error in sound velocity estimations in a target medium using ultrasound transducers comprising the steps of:

(a) applying a tracked ultrasound transducer oriented along an aiming axis to the outer surface of a target medium:

(b) applying a central tracking transducer oriented along an axis normal to the aiming axis of said tracked transducer to the outer surface of a target medium;

(c) applying a left and a right outer tracking transducer to the outer surface of a target medium, each of said outer tracking transducers placed on an opposite side of said central tracking transducer forming a tracking transducer axis with said central tracking transducer, said tracking transducer axis being parallel to said aiming axis and said left and right outer tracking transducers oriented at angles P and −P, respectively, from an axis normal to the aiming axis toward said central tracking transducer;

(d) employing a means for measuring the energy and travel time of signals produced by said ultrasound transducers;

(e) generating a tracked beam from said tracked ultrasound transducer which is misdirected at an angle T from said aiming axis;

(f) receiving ultrasound energy scattered from scatterers along said tracked beam to each of said tracking transducers;

(g) measuring the travel time required for ultrasound energy

to travel from the tracked transducer to each of said tracking transducers;

(h) recording each of said measured travel times;

(i) relocating each of said tracking transducers a distance Δx from its present location in the same direction along said tracking transducer axis;

(j) repeating steps (d)–(i) to obtain a plurality of data sets for travel time at each location for each of said tracking transducers;

(k) plotting the plurality of data sets obtained in step (j) for each of said tracking transducers;

(l) fitting a line to each of the plots made in step (k);

(m) estimating the speed of sound along the tracked beam by calculating the slope of each of the fitted lines obtained in step (l);

(n) solving the following two equations, labeled (1) and (2), for the speed of sound, C:

$$C = CE\,[1 - \sin(T)]/\cos(T); \text{ and} \quad (1)$$

$$\sin(T)\,\frac{\sin(2P) + \cos(T + P) - \cos(T - P)}{[\cos(T + P)]\,[\cos(T - P)]} = \frac{C}{CB} - \frac{C}{CA} \quad (2)$$

where

CE=the speed of sound obtained in step (m) for the central tracking transducer;

T=the angle of misdirection which the tracked beam undergoes in step (d);

P=the angle between the axis along which the left outer tracking transducers is aimed and an axis normal to the aiming axis;

CB=the speed of sound obtained in step (m) for one of said outer tracking transducers; and

CA=the speed of sound obtained in step (m) for the other outer tracking transducer.

4,878,501

ELECTRONIC STETHOSCOPIC APPARATUS

Ming-Jeng Shue, No. 14, Lane 8, Chung-I St., Taichung, Taiwan

Continuation-in-part of Ser. No. 27,101, Mar. 13, 1987, and a continuation-in-part of Ser. No. 926,578, Nov. 4, 1986, Pat. No. 4,723,555. This application Jun. 25, 1987, Ser. No. 66,222

The portion of the term of this patent subsequent to Feb. 9, 2005, has been disclaimed.

Int. Cl.[4] A61B *5/02*

U.S. Cl. 128—715 **6 Claims**

1. An electronic stethoscopic apparatus comprising:

a housing means adapted for hand gripping and operational control;

an audio-signal amplifying means having input/output terminals provided therein installed in said housing means for amplifying and outputting audio signals therefrom;

power supply means replaceably installed in said housing means and electrically connected to said audio-signal amplifying means for providing power thereto;

an audio-wave guiding means disposed on said housing means for receiving and transmitting sound waves;

transducing means having output terminals provided thereto disposed in said audio-wave guiding means and electrically connected to said audio-signal amplifying means for receiving said sound waves and converting same into electrical audio signals to be fed into said audio-signal amplifying means; and

a body contact means composed of a sound transmission pipe with a diaphram on one side, a bell on another, and a sound-wave duct in a middle portion thereof, sleevingly connected to said audio-wave guiding means for detecting sound waves from a body portion of a patient.

4,878,502

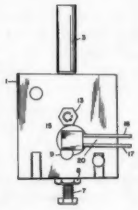
BREATHING SENSOR

Henry G. Dietz, 80 Salisbury Ave., Garden City, N.Y. 11530

Continuation-in-part of Ser. No. 646,294, Aug. 31, 1984, abandoned. This application Mar. 27, 1986, Ser. No. 844,523

Int. Cl.[4] A61F *5/00*

U.S. Cl. 128—725 **2 Claims**



1. A gas flow sensor comprising, a transparent housing, means for defining within said housing a transparent flow path for said gas flow and having a vent in communication with the atmosphere, means for defining a first stop position and other means for defining a second stop position both disposed within a section of the flow path, means for providing communication with said flow path for applying thereto a low value negative pressure from infant nasal airflow to said section of the flow path, a very low density ball made of expanded styrene and freely movable within said flow path in response to said negative pressure and disposed initially at said first stop position and movable to said second stop position in response to said negative pressure when applied to said flow path, an anti-static, anti-static electroconductive coating on said ball, an infrared light source energizable to emit infrared light along a path of infrared light interrupted when said ball is at said first stop position and said infrared light is not interrupted when the ball is at second stop position, detector means for detecting uninterrupted infrared light when the ball moves to said second stop position, and means responsive to detection of said infrared light by said detector means for developing a signal representative of the existence of a negative pressure in said flow path.

4,878,504

ANKLE BRACE WITH COMPRESSION STRAPS

Ronald E. Nelson, 405 Sunset Ln., Cambridge, Minn. 55008

Filed Jul. 22, 1988, Ser. No. 223,083

Int. Cl.[4] A61F *3/00*

U.S. Cl. 128—80 H **17 Claims**

1. An ankle brace to be worn on a foot and ankle in encompassing relationship to the lateral malleolus and medial melleolus of the ankle on the lateral and medial sides of the foot respectively, comprising:

a base of flexible sheet-like material shaped to encompass the ankle region and proximate lateral and medial portions of the foot; said base having medial and laterial forward edges that come together toward one another over the

forward ankle and from superior foot portion when the base is installed on the foot, and means for fastening the medial and lateral forward edges with respect to one another to secure the base with respect to an ankle and foot;

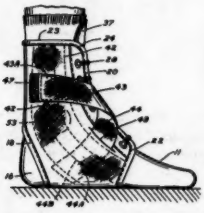
said base including an outer layer and an inner layer of sheet-like material;

said base having a plurality of medial seams sewn between the outer and inner layers located on the medial side thereof in parallel spaced apart relationship and being forwardly curved extending from the region of the ankle to the mid-foot region;

said base having a plurality of lateral seams sewn between the outer and inner layers located on the lateral side thereof in parallel spaced apart relationship and being forwardly curved extending from the region of the ankle to the mid-foot region;

a medial compression strap comprised as a flat elongate longitudinal member having a fixed end section fixed to the medial side of the base and a free end extendable around the base, said fixed end section having a width and length of sufficient dimension to span segments of said plurality of medial seams, said end section being fixed to the base by said segments of said plurality of medial seams and being embedded between the inner and outer layers of the base;

a first medial comprssion strap fastening means located on the free end of the medial compression strap, and second medial compression strap fastening means located on the lateral side of the base above the area covering the lateral



malleous and positioned to be releasably engaged by the first fastening means upon wrapping the medial compression strap in tension around the front superior foot surface portion of the base and the vicinity of the lateral malleolus, said fixed end section of the medial compression strap fixed to the base orientated so that the medial compression strap is directed to extend forwardly and upwardly so that it can extend from the fixed end section across the front superior foot surface to the second medial compression strap fastening means;

a lateral compression strap comprised as a flat elongate longitudinal member having a fixed end section fixed to the base and a free end extendable around the base, said fixed end section having a width and a length of sufficient dimension to span segments of said plurality of lateral seams, said end section being fixed to the base by said segments of said plurality of lateral seams and being embedded between said inner and outer layers of the base; and

a first lateral compression strap fastening means located on the free end of the lateral compression strap, and second lateral compression strap fastening means located on the medial side of the base above the area covering the medial malleous and positioned to be releasable engaged by the first fastening means upon wrapping the lateral compression strap in tension around the front superior foot portion of the base and the vicinity of the medial malleolus, said fixed end section of the lateral compression strap fixed to the base orientated so that the lateral compression strap is directed to extend forwardly and upwardly so that it can extend from the fixed end section across the front superior foot surface to the second lateral compression strap fastening means, said base having an opening for extension of the free end of the lateral compression strap from between said outer and inner layers in said forward and upward direction.

4,878,505

ANKLE SUPPORTING SLEEVE

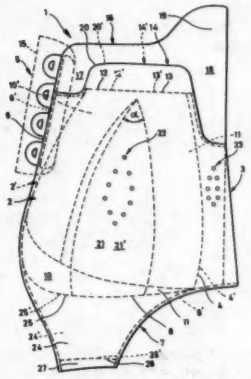
Arthut Thanner, Am Fallenweg 30, D-8884, Höchstädt/Donau, Fed. Rep. of Germany

Filed Aug. 30, 1988, Ser. No. 238,393

Claims priority, application Fed. Rep. of Germany, Sep. 1, 1987, 3729197

Int. Cl.[4] A61F *13/00*

U.S. Cl. 128—882 **12 Claims**



1. Ankle supporting sleeve comprising:

two side parts each having an inner surface and an outer surface;

a rear connecting part connecting said side parts by their rear longitudinal edges to from a main portion of the sleeve;

a releasable front fastening means for releasably connecting the opposite front longitudinal edges of said side parts;

a lower connecting part connecting said side parts by each of their bottom edges; and

front and rear elongated receiving pockets defined between the inner and outer surfaces of each side part, each of the receiving pockets adapted to receive a corresponding elongated, slightly curved reinforcing part, wherein

the front and rear receiving pockets are slightly curved and extend along the corresponding respective front and rear longitudinal edges and each defines an insertion opening extending through the outer surface of its respective side part and provided with a releasable pocket fastening means for releasably closing its associated insertion opening,

top portions of the front and rear receiving pockets merge at each side to from an acute angle,

the insertion openings are located in the vicinity of the acute angle,

the front and rear receiving pockets located on one of the side parts are considerably longer than the correspond front and rear receiving pockets located on other of the two side parts,

the removable reinforcing parts exhibit a slight curvature,

at least one of the reinforcing parts differs from another of the reinforcing parts in at least one physical characteristic selected from the group consisting of hardness, curvature and flexibility,

the side parts and the connecting part are provided with an cushioned U-shaped extension part which extends above said main portion, and

at least an outer surface of the U-shaped extension part is formed from a material which is softer and more flexible than the corresponding materials forming the outer surfaces of the main portion of the supporting sleeve.

4,878,506

METHOD OF AND APPARATUS FOR TREATING ACCUMULATIONS OF FIBERS OF TOBACCO OR OTHER SMOKABLE MATERIAL

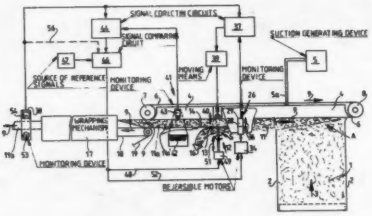
Peter Pinck, Gross-Hansdorf; Heinz-Christen Lorenzen, Wentorf; Uwe Heitmann, and Wolfgang Siems, both of Hamburg, all of Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany

Filed Jul. 28, 1988, Ser. No. 225,692

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1987, 3725364

Int. Cl.[4] A24C *5/18, 5/28, 5/34*

U.S. Cl. 131—84.4 **45 Claims**



1. A method of treating accumulations of fibers of tobacco, other smokable material or filter material for tobacco smoke, comprising the steps of establishing for the fibers an elongated path; supplying fibers into a first portion of the path in such quantities that the fibers form a stream which contains a surplus of fibers; advancing the stream along said path in a predetermined direction by a foraminous conveyor, including attracting the fibers to the conveyor by suction; removing the surplus from the stream in a second portion downstream of the first portion of the path to thus convert the stream into a filler, including trimming the stream in a plane which is spaced apart from the conveyor; monitoring the mass flow of fibers in the path upstream of the second portion of the path and generating a succession of signals denoting the mass flow of fibers in successive increments of the stream; and moving the conveyor relative to the plane in response to said signals so as to maintain the mass flow of fibers in the filler within a predetermined range.

4,878,507

SMOKING ARTICLES

Paul D. Case, and David J. Dittrich, both of Southampton, England, assignors to British-American Tobacco Company, Ltd., London, England

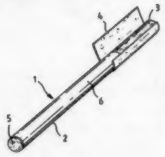
Filed Sep. 2, 1988, Ser. No. 239,867

Claims priority, application United Kingdom, Sep. 3, 1987, 8720726; Dec. 16, 1987, 8729389

Int. Cl.[4] A24D *1/00*

U.S. Cl. 131—336 **10 Claims**

1. A smoking article comprising a smoking material rod, which rod comprises smoking material and paper wrapper circumscribing said smoking material, the density of said smoking material in said rod being in a range of about 100 mg cm^{-3} to about 260 mg cm^{-3}, said smoking material comprising at least about 20% by weight of expanded tobacco, the air permeability of said wrapper being not more than about 20 Coresta units and said smoking article, when smoked under standard machine smoking conditions exhibiting a synergistic sidestream smoke component reduction effect, and providing not less than six puffs and yielding not more than about 17 mg total sidestream PMWNF and not more than about 35 mg total sidestream carbon monoxide.



4,878,508

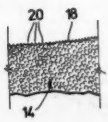
DENTAL DEVICE FOR CLEANING TEETH

Douglas D. Durbin, 851 Corporate Dr. Ste. 201, Lexington, Ky. 40503

Filed Mar. 28, 1988, Ser. No. 172,775

Int. Cl.[4] A61C *15/00*

U.S. Cl. 132—329 **11 Claims**



1. A dental device for cleaning teeth, comprising:

a resilient, elongated body member having two sides joined together along a line to form a substantially V-shaped cross-section, said body member further including texture means in the form of cilia on said sides for cleaning said teeth and means on distal edges of said sides for substantially preventing cutting of gingival tissue when said dental device is used to clean between teeth.

4,878,509

STEPLESS TILTING DEVICE FOR UMBRELLA

Po L. Tung, No. 20, Lane 673, Chung Chen Rd., Jen Teh Hsiang, Tainan Hsien, Taiwan

Filed May 10, 1989, Ser. No. 349,991

Int. Cl.[4] A45B *17/00*

U.S. Cl. 135—20 M **1 Claim**

1. A tilting device for an umbrella comprising:

a control block **(40)** received in an upper rod **(10)** of the umbrella, said control block **(40)** having a guided wheel **(41)** at an upper end portion therewithin;

a pull cord **(32)** connecting a winch **(30)** with a runner **(50)**

of the umbrella via said guide wheel (41), said winch (30) being controllable by a crank handle (31);

an elongate connecting member (70) connected to a lower end of said control block (40), said elongate connecting member (70) including a pivot hole (71) at a lower end therethrough;

an upper bending head (80) being a sleeve body connected to said upper rod (10), said upper bending head (80) including a central opening (81) for the passage of said elongate connecting member (70) and a pair of downward extending plates (82), each downward extending plate (82) having a pinhole (83) and an inclined slot (84) therethrough, said pinhole (83) and said inclined slot (84) of one downward extending plate (82) being in transverse alignment with said pinhole (83) and said inclined slot (84) of the other downward extending plate (82);

a spring member (85) mounted around said control block (40) and said elongate connecting member (70);

a lower bending head (90) being a sleeve body connected to a lower rod (20) of the umbrella, said lower bending head (90) including a central recess (91) at an upper end thereof for receiving said pair of downward extending plates (82), each lateral side of said lower bending head (90) being formed with a pinhole (93) and a guide slot (94) therethrough, said pinhole (93) and said guide slot (94) formed on one lateral side being in transverse alignment with said pinhole (93) and said guide slot (94) of the other lateral side, each guide slot (94) having an obtuse angular shape;

a pin (95) extending through the pinholes (83), (93) for pivotally connecting said upper bending head (80) and said lower bending head (90);

a displacing pin (96) extending through said guide slots (94), said inclined slots (84) and said pivot holes (71) for connecting said elongate connecting member (70) to said upper bending head (80) and said lower bending head (90);

whereby said pull cord (32) is pulled via said guide wheel (41) thereby causing said runner (50) to move upwards and engage with a fixed collar (11) of the umbrella when said crank handle (31) is rotated; said control block (40) is lowered along said upper rod (10) when said crank handle (31) is further rotated to pull said pull cord (32) and in the meantime, said elongate connecting member (70) together with said displacing pin (96) are movable along said guide slots (94) so that said upper bending head (80) rotates pivotally about said pin (95) to tilt said upper rod (10) with respect to said lower rod (20); said spring (70) is restored so that said control block (40) moves up to an original position thereof thus causing said upper bending head (80) and said lower bending head (90) to return to vertical positions thereof when said pull cord (32) is released.

4,878,510

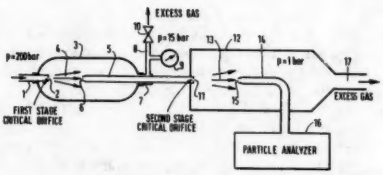
METHOD FOR REDUCING PRESSURE OF HIGHLY COMPRESSED GASES WITHOUT GENERATION OF CONDENSATION DROPLETS

Gerhard Kasper, Downers Grove; Horng-Yuan Wen, Brookfield, and Yukinobu Nishikawa, Darien, all of Ill., assignors to American Air Liquide, New York, N.Y.

Filed Oct. 13, 1987, Ser. No. 107,173

Int. Cl.[4] E03B *1/00*

U.S. Cl. 137—1 **14 Claims**



1. A method for reducing the pressure of a high pressure compressed gas at a predetermined temperature level to a low pressure without causing condensation of condensible vapors contained in said compressed gas which comprises: causing a succession of pressure drops by expanding said high pressure compressed gas through a plurality of consecutive critical orifices into a plurality of consecutive zones, each zone having a pressure less than said high pressure and less than the previous zone; and providing for sufficient space between said consecutive orifices, so as to allow the gas temperature to return to its predetermined temperature level before further expansion, thereby creating a low pressure expanded gas, each of said pressure drops being less than a pressure drop necessary to cause condensation of said condensible vapors.

4,878,511

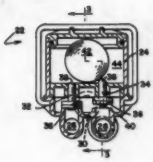
VALVE ASSEMBLY FOR A VEHICULAR FUEL TANK

Clarence D. Fox, Decatur, Ill., assignor to Borg-Warner Automotive, Inc., Troy, Mich.

Filed Oct. 16, 1986, Ser. No. 919,738

Int. Cl.[4] F16K *17/36*

U.S. Cl. 137—38 **19 Claims**



10. An apparatus for controlling fluid withdrawal from a container comprising:

a housing adapted to be carried by said container and having two intake ports both of which may fluidically communicate with an outlet port;

a weighted spherical valve actuator arranged to roll in said housing along a predetermined path in response to tilting of the container; and

a pair of valve members disposed in spaced alignment beneath said predetermined path in said housing for reciprocal movement between first and second positions, one valve member being disposed between each inlet port and said outlet port such that substantially the entire weight of said valve actuator is imposed on either one of said valve members automatically when said container is tilted whereby causing said one of said valve members to move from one position to another.

4,878,512

VALVE MECHANISM

Fred L. Pirkel, Phoenixville, Pa., assignor to Ogontz Controls Company, Willow Grove, Pa.

Continuation of Ser. No. 555,379, Nov. 28, 1983, abandoned, which is a continuation of Ser. No. 460,927, Jan. 28, 1983, Pat. No. 4,460,007. This application Mar. 1, 1988, Ser. No. 165,427

Int. Cl.[4] E03B *7/10*; F16K *17/38*

U.S. Cl. 137—62 **2 Claims**

1. A valve for use in draining a liquid system to prevent the liquid in the system from freezing under low ambient temperature conditions comprising:

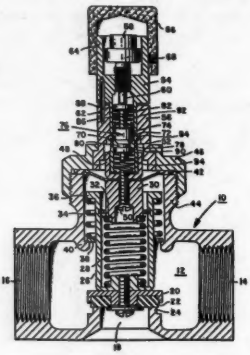
means providing a valve chamber connectable to the liquid system, said valve chamber having a drain outlet;

a valve element cooperating with said drain outlet and movable from a first position towards a second position, the valve element in its first position closing the drain outlet and, during movement thereof towards its second position, opening the drain outlet;

means in contact with the valve element for urging the valve element towards its second position;

latch means connectable to the valve element for holding the valve element in its first position and releasable to permit the valve element to move towards its second position under the influence of the urging means;

a temperature sensor including a temperature sensing element that is in thermal contact with the liquid in the liquid system when the valve is connected to said system, and means responsive to the temperature sensing element for releasing the latch means when the temperature of the sensing element falls below a predetermined level;



means providing a heat-conductive housing surrounding at least a substantial part of the temperature sensing element, said means isolating the temperature sensing element from the ambient atmosphere substantially completely; and

means for conducting heat from the liquid system to the heat-conductive housing when the valve chamber is connected to the liquid system;

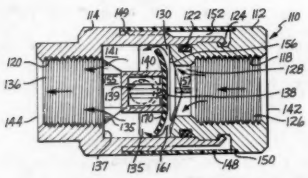
whereby the valve is prevented from opening while the liquid in the liquid system is warm, yet responds rapidly to a drop in the ambient temperature when the liquid in the liquid system is cool.

4,878,513

QUICK VENT VALVE FOR AIR BRAKE LINE

David P. Ashby, Kirkland, and Charles J. Green, Vashon, both of Wash., assignors to GT Development Corporation, Tukwila, Wash.

Filed Sep. 28, 1988, Ser. No. 250,758
Int. Cl.[4] B60T *15/30*
U.S. Cl. 137—102 **15 Claims**



1. A vent valve for an air brake line having a supply end and a delivery end, said valve comprising:

a valve housing having means for attaching the housing to the line intermediate said ends; said housing defining a flow passage extending therethrough, an exhaust passage communicating the flow passage with the exterior of the housing, an inlet port positioned to communicate the flow passage with the supply end of the line, and a delivery port positioned to communicate the flow passage with the delivery end of the line;

a valve element having a supply position in which it closes the exhaust passage and allows flow through the flow passage from the supply end of the line to the delivery end of the line when there is higher pressure at the inlet port than at the delivery port, and an exhaust position in which it substantially closes the flow passage and allows flow from the delivery end of the line through the delivery port and out of the housing through the exhaust passage when there is higher pressure at the delivery port than at the inlet port; said valve element being adapted to respond substantially instantaneously to greater pressure at the inlet port than the delivery port by moving into its supply position; and

a shunt passageway communicating two portions of the flow passage on opposite sides of the valve element to prevent maintenance of a higher pressure at the delivery port than the inlet port due to movement of the valve element away from its exhaust position before pressures at the delivery port and the inlet port are equalized;

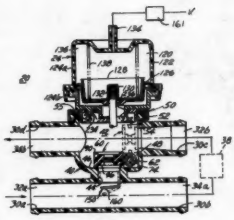
in which the exhaust passage has an inner end surrounded by a valve seat that is substantially coaxial with the flow passage, and an outer end spaced radially from the flow passage; and the flow passage extends around and past said valve seat and is coaxial with the inlet port and the delivery port.

4,878,514

HEATER CONTROL VALVE WITH FLEXIBLE DEFLECTOR

Allan W. DeJong, Chatham, Canada, assignor to Siemens-Bendix Automotive Electronics Limited, Chatham, Ontario, Canada

Filed Sep. 19, 1988, Ser. No. 246,580
Int. Cl.[4] G05D *7/01*; F16K *11/052*
U.S. Cl. 137—110 **10 Claims**



1. A fluid control valve comprising:

a valve body defining a chamber and a bypass passage, for receiving fluid, extending therefrom,

first conduit means, in fluid communication with the bypass passage, for defining a first inlet adapted to receive fluid and a first outlet adapted to communicate fluid to an external device;

second conduit means, in communication with the chamber for defining a second inlet, adapted to receive flow from the external device, and a second outlet;

the valve body further including a first seating surface, within the chamber, disposed about a downstream end of the bypass passage and a second seating surface disposed about the second inlet within the chamber;

flow control means for regulating the flow rate of fluid, from the first inlet to the first outlet, to a maximum value, and for prohibiting fluid flow through the external device by terminating fluid communications between the second inlet and second outlet and first means including a resilient divertor means deflectable in response to fluid flow, for

diverting fluid into the bypass passage as a function of the rate of fluid flow through the first conduit means.

4,878,515

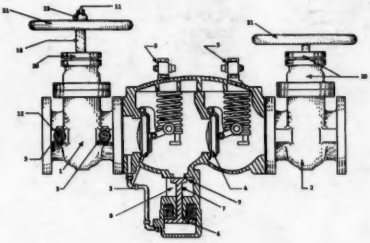
WATER ACCESS PREVENTER

Robert B. Stevens, P. O. Box 26284, Honolulu, Hi. 96825

Filed Oct. 7, 1988, Ser. No. 254,574

Int. Cl.[4] F16K *24/00, 35/06*

U.S. Cl. 137—218 **18 Claims**



13. A water access preventer for a testable backflow prevention assembly said assembly comprising: an upstream gae valve, a primary check valve, an air inlet valve, a downstream gate valve, an internally threaded test cock located between the upstream gate valve and the primary check valve, and an internally threaded test cock located between the primary check valve and the air inlet valve; wherein a means is provided to prevent access to potable water within the backflow prevention assembly said means comprising: an externally threaded plug, for each of the two test cocks, wherein each plug is designed to mate with the internal threading of a test cock, and wherein a means is provided to lock each plug within a test cock such that a key is required to unlock or remove each plug from a test cock, and, wherein, a means is provided to prevent closure of the upstream gate valve.

4,878,516

ARRANGEMENT FOR PERITONEAL DIALYSIS AND CONNECTOR THEREFORE

Bernd Mathieu, Spiessen-Elfersberg, Fed. Rep. of Germany, assignor to Fresenius AG, Fed. Rep. of Germany

Continuation of Ser. No. 850,855, Apr. 11, 1986, abandoned. This application Oct. 7, 1988, Ser. No. 256,165

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1985, 3513204

Int. Cl.[4] A61M *5/14*

U.S. Cl. 137—240 **6 Claims**

1. A connector for use in peritoneal dialysis comprising:

a first connector piece having means defining an introduction opening;

a second connector piece having a central tube section introducible into said introduction opening of said first connector piece;

a first connection means, on one of said two connector pieces, for connecting to a first flexible tube portion, said first flexible tube connection being connected to a first bag containing dialysis solution;

a second connection means, on a second connector piece, for connecting to a second flexible tube portion, said second flexible tube connection being connectable to a peritoneal catheter;

a third connection means for connecting a third flexible tube portion to a second bag;

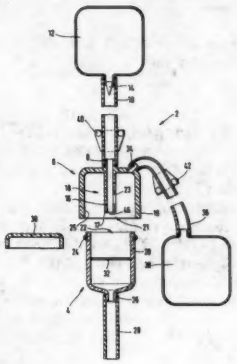
at least first and second clamps for clamping off the first and third flexible tube portions;

said central tube section **(16)** of said second connector piece **(6)** engaged and surrounded by an outer sleeve **(19)**, said first connector piece **(4)** surrounded on its outer surface by an annular seal **(24)** mating with an inner face **(25)** on said outer sleeve **(19)** forming a sealing arrangement with the interior of the connector;

said third connection **(34)** originatiing from a rearward section of said outer sleeve **(19)**;

said central tube section **(16)** further comprising at least one radial opening **(23)**;

said first connector piece **(4)** further comprising a closure member **(32)** oriented between said introduction opening **(22)** and said second connection means **(26)** having a first connection state (FIG. **2**) defining a means for flushing disinfectant and particles from said connector, a front end of said central tube section **(16)** oriented between closure member **(32)** causing a first fluid communication path between said first bag **(12)** through said central tube section **(16)**, space **(44)** surrounding said central tube section **(16)** within said connector **(6)**, and said third connection means **(34)** to the second bag **(38)**;



a second connection state (FIG. **3**) having a second fluid communication path, said front end of the central tube section **(16)** penetrating said closure means **(32)** and said central tube section **(16)** closed by the first clamp **(40)** establishing a fluid connection from the supply line **(28)** through the central tube section **(16)** and said radial opening **(23)** to the second bag **(38)**; and

a third conneciton state (FIG. **4**) having a third fluid communication path, said first clamp **(40)** on said first flexible tube portion **(10)** establishing a fluid conneciton between said first bag and said supply line **(28)** when said second clamp **(42)** is closed.

4,878,517

HIGH PRESSURE HOSE PULSATION ATTACHMENT

Charles J. Prange, Cridersville, Ohio, assignor to Sewer Rodding Equipment Co., Lima, Ohio

Filed Aug. 15, 1988, Ser. No. 231,949

Int. Cl.[4] A62C *35/00;* **B08B** *3/00*

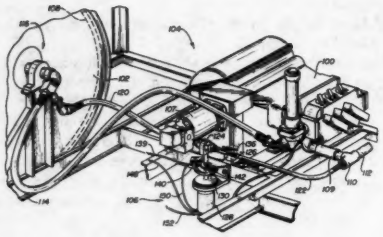
U.S. Cl. 137—355.12 **8 Claims**

1. Apparatus for use in a sewer cleaning machine wherein cleaning is performed by a high pressure hose terminated by a jet nozzle which pulls the hose through the sewer by rearwardly directed water jets, said apparatus comprising:

pressure bleeder means connected to the hose for relieving the high pressure developed therein including first valve means for operating said pressure bleeder means;

pulse control means for automatically cycling said first valve means to generate a series of high prssure pulses at the water jets to assist in cleaning by better penetrating block-

ages formed by concentrated accumulations of refuse and debris; and



switch means for selectively activating and deactivating said pulse control means.

4,878,518

IN-TANK FUEL RESERVOIR WITH FUEL VAPOR SEPARATION

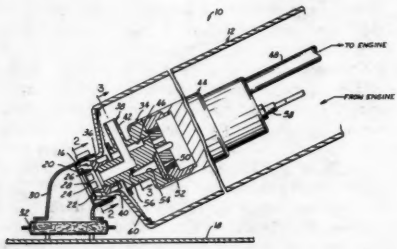
Charles H. Tuckey, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.

Continuation-in-part of Ser. No. 153,316, Feb. 8, 1988, Pat. No. 4,831,990, which is a continuation-in-part of Ser. No. 49,537, May 14, 1987, Pat. No. 4,807,582, which is a continuation-in-part of Ser. No. 928,184, Nov. 7, 1986, Pat. No. 4,747,388. This application Jun. 2, 1988, Ser. No. 201,418

The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.

Int. Cl.[4] B60K *15/02*; F04F *5/02*

U.S. Cl. 137—448 **10 Claims**



1. A fuel delivery system for automotive engines and the like comprising:

a canister for positioning within a fuel tank and having a lower end with an opening and means forming an internal wall spaced from said lower end and dividing said canister into upper and lower canister chambers,

an electric-motor fuel pump having a fuel inlet, a primary fuel outlet for feeding fuel under pressure to an engine and a secondary fuel outlet for supplying fuel under pressure, said fuel pump including both said outlets being positioned within said upper chamber, and

fuel aspiration module means within said canister extending between and coupling said fuel pump and said lower chamber, said fuel pump aspiration module means including fluid conduit means extending through said wall having an inlet end in said lower chamber and an outlet end positioned in said upper chamber, and nozzle means within said module means directly coupling said secondary outlet to said fluid conduit means within said canister for aspirating fuel through said fluid conduit means from said lower chamber to said upper chamber.

4,878,519

PISTON ACCUMULATOR

Josef Berding, Ludwigsburg; Hannes Bertling, Vaihingen; Thomas Lees, Ludwigsburg, and Carsten Pabst, Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

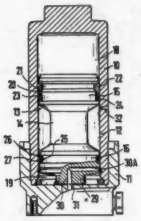
PCT No. PCT/DE88/00008, § 371 Date Aug. 11, 1988, § 102(e) Date Aug. 11, 1988, PCT Pub. No. WO88/05134, PCT Pub. Date Jul. 14, 1988

PCT Filed Jan. 7, 1988, Ser. No. 243,025

Claims priority, application Fed. Rep. of Germany, Jan. 10, 1987, 3700576

Int. Cl.[4] F16L *55/04*

U.S. Cl. 138—31 **5 Claims**



1. An accumulator comprising:

a cylinder formed with a substantially closed chamber;

a piston formed with a small-diameter central region and a pair of large-diameter end regions flanking the central region and each formed with an outwardly open annular groove, the piston subdividing the chamber into a gas compartment at one of the end regions, a liquid compartment at the other end region, and an annular charging compartment surrounding the central region, the piston being displaceable in the cylinder to oppositely vary the volumes of the gas and liquid compartments, the liquid compartment being adapted for connection to a hydraulic system;

respective gas and liquid seals engaged in the grooves between the gas- and liquid-compartment end regions of the piston and the cylinder and both constructed to inhibit fluid flow from the respective gas and liquid compartments into the charging compartment, the liquid seal also being constructed to inhibit fluid flow from the charging compartment into the liquid compartment but the gas seal being constructed to permit fluid flow from the charging compartment past itself into the gas compartment; and

means including a passage formed in the cylinder and opening directly into the charging compartment for introducing a gas under pressure into same and for thereby pressurizing the charging and gas compartments by flowing past the gas seal into the gas compartment.

4,878,520

HEAT INSULATING STRUCTURES FOR LOW-TEMPERATURE OR CRYOGENIC PIPINGS

Masao Nakamura, Honolulu, Hi., and Hiroshi Tonokawa, Suzuka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Tokyo, Japan and The Dow Chemical Company, Midland, Mich.

PCT No. PCT/US84/00892, § 371 Date Jan. 22, 1986, § 102(e) Date Jan. 22, 1986, PCT Pub. No. WO86/00122, PCT Pub. Date Jan. 3, 1986

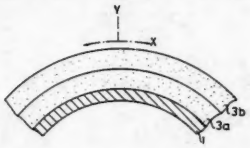
PCT Filed Jun. 7, 1984, Ser. No. 83,351

Int. Cl.[4] F16L *9/14*; F17C *7/02*

U.S. Cl. 138—149 **1 Claim**

1. A heat insulating structure for low-temperature or cryogenic pipings, comprising at least one heat insulating barrier and at least one moisture barrier which are laid on the outer

surface of a piping to be heat-insulated, and at least one sheathing layer, wherein said heat insulating barrier comprises an extruded styrenic resin foam and wherein, as expressed in terms of the three-dimensional coordinates X (circumferential direction), Y (thicknesswise direction) and Z (longitudinal



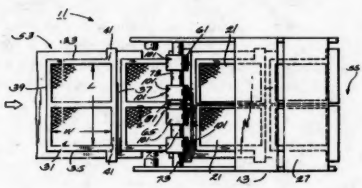
direction), said heat insulating barrier has a Y-axial water vapor permeability Py of 1.5 g/m^2·hr or less and at least the heat insulating barrier most adjacent to said piping has X-axial and Z-axial elongations at rupture Ex and Ez in the range of 8 to 40 percent.

4,878,521

APPARATUS FOR PARTING AND PASTING BATTERY PLATE GRIDS

Roy A. Fredrickson, Stevensville, Mich., assignor to Mac Engineering & Equipment Company, Inc., Benton Harbor, Mich.

Filed Oct. 28, 1988, Ser. No. 264,055
Int. Cl.[4] H01M *7/00*
U.S. Cl. 141—1.1 **19 Claims**



1. Apparatus for dividing a multi-unit battery plate grid including at least two connected battery plate grids into separated individual battery plate grids and for subsequently pasting the separated individual battery plate grids, said apparatus comprising means for dividing a multi-unit battery plate grid into separated individual battery plate grids, and means for thereafter pasting the separated individual battery plate grids.

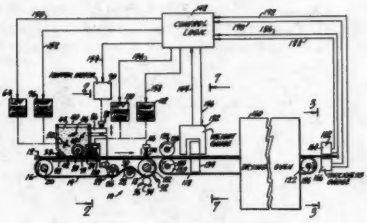
4,878,522

PASTE HOPPER CONTROL SYSTEM

Paul R. Ostrander, Mississauga, Canada, assignor to Valmet-Sentrol Ltd., North York, Canada

Continuation of Ser. No. 99,382, Sep. 19, 1987, abandoned. This application Dec. 23, 1988, Ser. No. 291,378
Int. Cl.[4] H01M *4/82, 4/20*
U.S. Cl. 141—11 **19 Claims**

1. A method of applying paste to a stream of grid material including the steps of conveying said material along a path, supplying paste to said material at a location along said path to form a plate, forming a clearance gap along said path for the passage of said plate, measuring the thickness of said plate following said clearance gap, controlling the width of said clearance gap in accordance with said measured thickness, measuring the weight of said plate independently of said thickness, and controlling the supplying of paste to said material



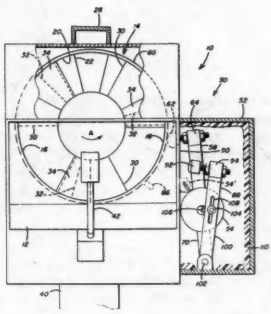
independently of said clearance gap in accordance with said measured weight.

4,878,523

ICE MEASURING AND DISPENSING MACHINE

William A. Balsamico, 1722 Marion Dr., and Walter J. Minnick, Jr., 1732 Marion Dr., both of North Huntingdon, Pa. 15642

Filed Apr. 4, 1988, Ser. No. 177,149
Int. Cl.[4] B65B *3/16*
U.S. Cl. 141—114 **12 Claims**



1. An improved ice measuring and dispensing machine of the type which includes an ice supply hopper, a rotating housing having a vertical axis and at least three measuring and dispensing chambers continuously rotating about said vertical axis at a predetermined speed, and a discharge tube; each of said chambers rotating beneath said ice supply hopper to receive said ice by gravity flow therefrom; said each chamber filled with said ice from said ice supply hopper rotating over said discharge chute to discharge said ice therein by gravity flow down said discharge chute into an ice bag; said improvement comprising:

said rotating housing having a cylindrical wall which partially defines each of said chambers;

said cylindrical wall having an outer surface including a continuous cylindrical band region;

means for selectively vibrating said cylindrical wall during said rotating of said housing;

said means for selectively vibrating said cylindrical wall including a hammer device which has a first end and a head on said first end thereof; and

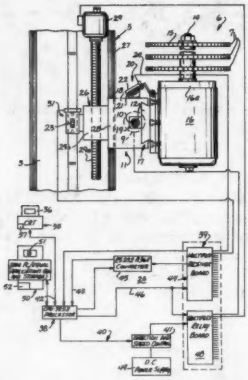
said means for selectively vibrating said cylindrical wall including means for reciprocating at least said first end of said hammer device toward and away from said outer surface of said cylindrical wall to cause said head on said first end of said hammer device to make repeated, jarring contact in said continuous cylindrical band region of said cylindrical wall.

4,878,524

WOODWORKING MACHINE HAVING A PLURALITY OF SEQUENTIALLY OPERATIVE MULTIPLE TOOL UNITS

Bruce C. Rosenthal; Kevin L. Zill, both of Sheboygan; Kevin R. Claerbaut, Oostburg; David M. Berglund, and Kenneth L. Grover, both of Plymouth, all of Wis., assignors to Kohler General Corp., Sheboygan Falls, Wis.

Filed Jun. 13, 1988, Ser. No. 206,268
Int. Cl.[4] B27B *1/00*; B27M *3/00*
U.S. Cl. 144—356 **17 Claims**



12. A woodworking apparatus adapted to produce a line of edge worked wood products having edge profiles including a line of different profiles with interrelated recessed and projecting surfaces, comprising a frame structure, means for successive transport of product along a fixed work path, a first work station and a second work station adjacent said work path,

each of said work stations including a tool unit comprising a plurality of rotating cutting tools secured to a drive spindle, a tool unit support structure mounted to said frame structure for positioning said tool unit in said work path, said support structure having a first slide unit having an axis parallel to the axis of the spindle for aligning of an individual tool in said work path and a second slide unit having a lateral axis of movement for positioning of a tool unit relative to the edge of the work path, first motor means secured to said support structure and said first slide unit for moving said too unit along said first axis, second motor means connected to said support structure and coupled to said second slide unit for positioning of said spindle along said second axis of movement, first and second position sensing means secured to said support structure for sensing the corresponding position along the first and second axii, each of said sensing means including a movable member moving in the direction of first axis and a relatively fixed member with respect to the axis, said position sensing means establishing an absolute position output signal corresponding precisely to the position of said movable member and thereby the position of said tool unit and an individual tool of the tool unit relative to said work path,

said tools of said second stack of said second work station having cutting tools with a cutting edge related to and oriented to form predetermined extensions of the surface of said first cutting tools of said first work station whereby the cutting edge of at least some of said tools of said second station can be located in overlapping relation to the cut surface established by said first cutting tools to form extended surfaces and whereby combinations of said tools forming said plurality of profiles, and

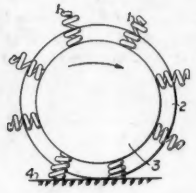
a control means including a position demand signal means and a position feedback input means, means receiving a command signal connecting each of said tool unit position sensing means to said input means and establishing a position signal, and said control means energizing said motor means to position said tool unit on said corresponding axii to establish a match between said command signals and said position signals and thereby position said tools in successive stations to form selected profiles.

4,878,525

EPICYCLOID ROLLING RESISTANCE ABATEMENT

Thomas A. Gardner, 3572 Banbury Dr., #70, Riverside, Calif. 92505

Filed Jan. 23, 1989, Ser. No. 299,896
Int. Cl.[4] B60B *9/00*
U.S. Cl. 152—14 **2 Claims**



1. The combination of a vehicle wheel and tire attached thereto and means of rolling resistance abatement comprising:

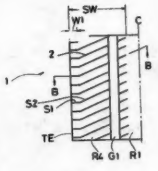
a plurality of radially mounted displacement elements on said wheel, the extremities of said elements being elongated beyond the periphery of the tire attached to the wheel, each element of which is within the track of the wheel, said elements surrounding the wheel and incurvate in a manner that a concave side of each element is opposite to the direction of movement of the vehicle, said elements being in a predetermined spaced relation along said wheel, each element contracting as each portion of the tire on the wheel at each predetermined space contacts a surface and each element expanding as each said portion of said tire rolls away from said surface.

4,878,526

RADIAL TIRE TREAD HAVING INCLINED AND AXIAL SIPES

Kiyoshi Ochiai, Kobe, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Filed Mar. 10, 1988, Ser. No. 166,259
Claims priority, application Japan, Mar. 10, 1987, 62-56145
Int. Cl.[4] B60C *11/12*
U.S. Cl. 152—209 R **13 Claims**



1. A radial tire having a tread provided with a plurality of circumferential grooves extending circumferentially of the tire to form a rib pattern thereon,

said tread having lateral side portions, each said side portion being provided with sipes arranged at intervals of 8 to 20 mm in the circumferential direction of the tire, each said

sipe having a length in the axial direction of the tire which is 10 to 35% of the tread width, said sipes each comprising

a main portion inclined with respect to the axial direction of the tire at an angle of 5 to 25 degrees and

an outer portion located axially outward of said main portion and extending axially to the tread edge at an angle of not more than 5 degrees to the axial direction of the tire, wherein the main portion is inclined to the axial direction of the tire at a larger angle than said outer portion,

the axial length of said outer portion of each sipe being not more than 10% of the tread width and being not more than 50% of the axial length of the sipe.

4,878,527

WHEEL RIM AND ASSEMBLY OF WHEEL RIM AND TIRE

Hiroyuki Noma, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

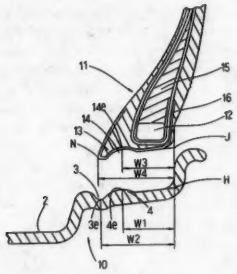
PCT No. PCT/JP87/00299, § 371 Date Feb. 10, 1988, § 102(e) Date Feb. 10, 1988, PCT Pub. No. WO87/06889, PCT Pub. Date Nov. 19, 1987

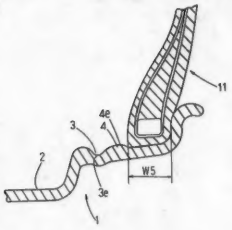
PCT Filed May 12, 1987, Ser. No. 143,159

Claims priority, application Japan, May 15, 1986, 61-112181

Int. Cl.[4] B60B *21/10*; B60C *15/02*

U.S. Cl. 152—379.3 **13 Claims**





1. A wheel rim for use with a tire having a conventional bead construction or a bead provided with a radially inwardly extending toe, comprising

a well for mounting the tire and

a protrusion located axially outside the well to define a circumferentially extending annular groove disposed axially outward thereof for receiving said radially, inwardly extending toe,

a hump provided axially outward of the annular groove,

a beadbase located axially outward of the hump and having a width of a conventionally standardized dimension, and

a rim flange disposed axially outward of the beadbase,

whereby the beadbase of the wheel rim can accommodate a conventional tire having a bead devoid of a radially inwardly extending toe or the annular groove, hump and beadbase can accommodate a tire having a bead with said radially inwardly extending toe.

4,878,528

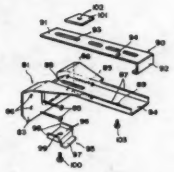
ELECTRIC BLIND

Masanori Kobayashi, Nagaoka, Japan, assignor to Kuron Corporation, Japan

Filed Mar. 9, 1988, Ser. No. 165,720

Int. Cl.[4] E06B *9/30*

U.S. Cl. 160—168.1 **10 Claims**



1. An electric blind to be mounted on a mounting support face, comprising:

a generally elongated casing frame having a pair of longitudinally extending guide rails;

at least two brackets fitted on said casing frame for fastening said casing frame therethrough to said mounting support face, each of said at least two brackets including a body having a mounted portion to be mounted on said mounting support face, a support arm extending generally at a right angle from said mounted portion, and a first slot formed in a base end of said support arm, a hanger head having a planar body fitted slidably on the support arm of said body of the bracket, a one-side clamping hook formed at a leading end of said planar body, and a second slot formed in the base end of said support arm, a hanger hook having a planar body fitted slidably on the base end of said support arm, and an other-side clamping end extending from the other end of said planar body, first fixing means being inserted through the planar body of said hanger hook and loosely through said first slot and said second slot for fixing said hanger head and said hanger hook on said support arm, and second fixing means for selectively fixing said hanger head on said support arm, said first fixing means having a first bolt and a nut having an internally threaded hole into which said first bolt is screwed, said second fixing means having a second bolt and an internally threaded hole formed in said hanger head;

a traverse rod borne rotatably in the longitudinal direction of said casing frame;

a plurality of runners made rotatable to run one by one on said guide rails when said traverse rod is driven;

a plurality of slats, each suspended from a corresponding one of said runners;

a tilt rod borne rotatably in the longitudinal direction of said casing frame;

tilt means meshing with said tilt rod for tilting said slats when rotated by said tilt rod;

traverse drive means for driving said traverse rod when the traverse drive means is excited;

tilt drive means for driving said tilt rod when the tilt drive means is excited; and,

drive transmitting means for transmitting driving forces of said traverse drive means and said tilt drive means to said traverse rod and said tilt rod, respectively,

and wherein said traverse drive means, said tilt drive means and said transmitting means are arranged in one end side of said casing frame, whereby said casing frame can be cut at an other end side to leave a casing frame of a desired length.

4,878,529

SECTIONAL OVERHEAD DOOR FOR LOW LINTEL HEIGHTS

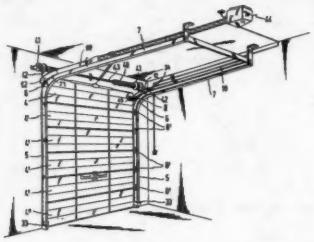
Michael Hormann, Steinhagen, Fed. Rep. of Germany, assignor to Hormann KG Brockhagen, Steinhagen, Fed. Rep. of Germany

Filed Jan. 28, 1987, Ser. No. 7,651

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1986, 3602520

Int. Cl.[4] E05D *15/16*

U.S. Cl. 160—201 **11 Claims**



1. Sectional overhead door arrangement for low lintel heights, the sectional overhead door arrangement being adapted to be mounted in an opening selectively opened and closed by the sectional overhead door arrangement, the sectional overhead door arrangement comprising:

a frame means for enabling an attachment of the sectional overhead door arrangement to a support structure, the frame means including vertically extending frame elements disposed on respective lateral sides of the opening with each frame element having spaced longitudinally extending rim portions;

a sectional door including a plurality of door leaf members articulated in succession in a vertical direction when the sectional door is in a closed position with one of the door leaf members forming an uppermost door leaf member and one of the remaining door leaf members forming a lowermost door leaf member;

first roller means disposed on respective lateral sides of each of the door leaf members other than the uppermost door leaf member for guiding a movement of the door leaf members, said first roller means being located in an upper area of the respective door leaf members;

primary guide rail means disposed on respective lateral sides of the opening for guiding a movement of the first roller means, each of said primary guide rail means including an approximately vertical guide section respectively secured to the vertically extending frame elements, an approximately horizontal guide section extending from the opening in a direction of an area to be closed by the overhead sectional door arrangement, and arcuate transitional guide sections provided at mutually facing ends of the approximately vertical and horizontal guide sections of said primary guide rail means for joining the respective approximately vertical and horizontal guide sections;

second roller means mounted on respective lateral sides of the uppermost door leaf member for guiding a movement of the uppermost door leaf member, said second roller means being located in an upper area of the uppermost door leaf member;

secondary guide rail means for guiding a movement of the second roller means, each of said secondary guide rail means including a substantially horizontal section disposed above an in parallel to the respective approximately horizontal guide sections of the primary guide rail means, and an intermediate guide member arranged so that the intermediate guide members are lowerable from the horizontal position in such a manner that the uppermost door leaf member, when the uppermost door leaf member is placed in the closed position, is transferred into a plane of the closed overhead sectional door arrangement along a shorter path than the remaining door leaf members;

a weight balancing shaft means having torsion spring means mounted thereon along with rope drum means and shaft bearing means arranged at respective ends of the balancing shaft means;

rope means retained on the respective rope drum means and respectively connected to a lower lateral zone of the door leaf member lowermost in the closed position of the overhead sectional door arrangement;

bearing bracket means affixed in an upper zone of each of the vertically extending frame elements of the frame means, said bearing bracket means including means for guiding accommodating a web member of an associated shaft bearing means; and

a threaded bolt means provided on each of the bearing bracket means for pivotally mounting the intermediate guide members of the secondary guide rail means to the bearing bracket means;

wherein each of said intermediate guide members of the secondary guide rail means includes a first angularly disposed end zone and a second curved end zone, and a linearly extending longitudinal section interposed between said first and second end zones of said intermediate guide members, said first angularly disposed end zone of the respective intermediate guide members being connected by said threaded bolt means to the respective bearing bracket means, said second curved end zone of the respective intermediate guide members being connected to the respective approximatley horizontal guide sections of the secondary guide rail means and to the approximately horizontal guide sections of the primary guide rail means, whereby the first roller means are guided along said approximately horizontal guide sections of the primary guide rail means and the second roller means are guided along the approximately horizontal guide sections of the secondary guide rail means during an opening and closing of the sectional overhead door.

4,878,530

BATHROOM PANEL

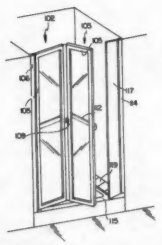
Marielle Jean, 25 rue Lucas, 03200 Vichy, France

Filed Apr. 1, 1988, Ser. No. 176,783

Claims priority, application France, Apr. 3, 1987, 87 05056; Apr. 3, 1987, 87 05057

Int. Cl.[4] E05D *15/00*

U.S. Cl. 160—211 **8 Claims**



1. A wall-mounted bathroom panel assembly comprising, in combination,

at least one panel having a rectangular frame and a pane surrounded by and supported by the frame, said frame including two horizontal short sides and two vertical long sides which each have a longitudinally extending corner;

an elongated vertical mounting member fixed to the bath-

room wall and having a longitudinal corner extending in a direction parallel to the long sides of said frame, said corner of the mounting member and said corner of each of the sides of said frame each defining a recess of circular cross-section;

pin means connecting one of the long sides of the frame of said panel to said mounting member for pivotal movement about a vertical axis and for sliding movement along said axis, said pin means having a pair of integrally connected pins respectively disposed in the corner recess in said mounting member and in the corner recess in said one long side of the frame; and

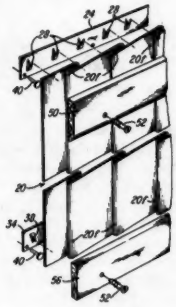
weight-compensating means cooperating with said mouting member and said panel for restricting sliding vertical movement therebetween.

4,878,531

WALL COVERING SUPPORT STRUCTURE AND METHOD

Douglas F. Stover, P.O. Box 5803, Athens, Ohio 45701

Filed Jan. 25, 1988, Ser. No. 147,853
Int. Cl.[4] A47H *23/00*
U.S. Cl. 160—327 **13 Claims**



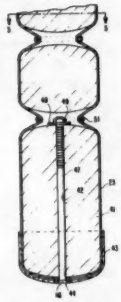
1. Wall covering structure for covering a wall, the wall having an upper portion and a lower portion, comprising: a first elongate flat support strip, the first elongate flat support strip having a pair of opposed longitudinally extending peripheral edges, the first elongate flat support strip having a flat surface extending along the length thereof and between the opposed longitudinally extending peripheral edges thereof, a series of spaced-apart protuberances integral with the first elongate flat support strip and extending outwardly therefrom thereof, the first elongate flat support strip being adapted to be positioned horizontally and attached to the upper portion of a wall with the protuberances extending upwardly from the first elongate flat support strip, a second elongate flat support strip, the second elongate flat support strip having a pair of opposed longitudinally extending peripheral edges, the second elongate flat support strip having a flat surface extending along the length thereof and between the opposed longitudinally extending peripheral edges thereof, a series of spaced-apart protuberances integral with the second elongate flat support strip and extending outwardly therefrom, the second elongate flat support strip being adapted to be positioned horizontally and attached to the lower portion of a wall below the first elongate flat support strip and with the protuberances extending downwardly from the second elongate flat support strip, a sheet of flexible cloth-like material having an upper portion and a lower portion, there being a series of vertical fold sections which extend between the upper portion of the sheet and the lower portion of the sheet, the sheet of flexible cloth-like material being adapted to be attached to the elongate flat support strips, the upper portion of the sheet being attached to and supported by the first elongate flat support strip with the protuberances of the first elongate flat support strip extending through the vertical fold sections at the upper portion of the sheet of cloth-like material, the lower portion of the sheet of cloth-like material being attached to and supported by the second elongate flat support strip with the protuberances of the second elongate support strip extending through the vertical fold sections at the lower portion of the sheet of cloth-like material, the sheet of cloth-like material thus covering a wall.

4,878,532

FLEXIBLE DECORATIVE INTERIOR SCREEN

John Strelnieks, 3850 Wind Drift Dr., Apt. 2C, Indianapolis, Ind. 46254

Filed Mar. 14, 1988, Ser. No. 167,773
Int. Cl.[4] A47H *1/00*
U.S. Cl. 160—332 **20 Claims**



1. A flexible screen comprising:

a series of vertically hanging columns;

each column having upper and lower end portions and comprising an elongate flexible tube containing solid filler material;

said tube being constricted at vertically spaced locations intermediate said end portions thereby facilitating the flexing of the column preferentially at said locations; and

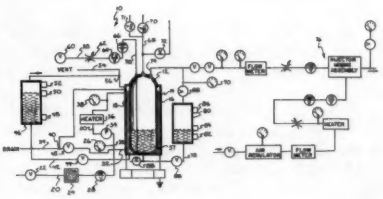
each column being hung suspended from hanger means at the upper end of the tube.

4,878,533

VAPORIZATION APPARATUS AND METHOD FOR PRODUCING CURING GAS

Boyd A. Wear; Craig V. Latham, and James A. Priser, all of 513 S. Lake St., Warsaw, Ind. 46580

Filed Mar. 7, 1988, Ser. No. 164,871
Int. Cl.[4] B22C *9/12*
U.S. Cl. 164—16 **15 Claims**



1. A method of vaporizing a curing agent which exists in a normally liquid phase comprising the steps of:

(a) delivering a quantity of said liquid curing agent to a container, said container at least partially surrounded by a jacket;

(b) delivering a quantity of a preheated fluid into said jacket, with the temperature of said preheated fluid being sufficiently high to heat said container and raise the temperature of said liquid curing agent to its boiling point or higher wherein the liquid curing agent is vaporized into a gaseous phase; and

(c) delivering a quantity of said gaseous phase curing agent to one or more work stations to be used in reacting or catalyzing a chemical curing reaction.

6. Apparatus for vaporizing a curing agent which exists in a normally liquid phase, said apparatus comprising container means for holding a quantity of said liquid phase curing agent, means for introducing a quantity of said liquid phase curing agent into said container means, a jacket at least partially surrounding said container means, said jacket holding a preheated fluid separate from said liquid phase curing agent with said preheated fluid being of sufficiently high temperature to heat said container means and liquid phase curing agent to a temperature at which the curing agent is vaporized into a gaseous phase, conduit means connecting said container means and a work station, and means in communication with said conduit means for delivering a quantity of said gaseous phase curing agent to said work station.

4,878,534

APPARATUS FOR THE COMPACTING OF GRANULAR MOLDING MATERIALS

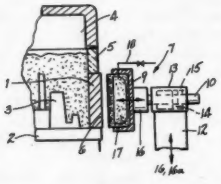
Wendelin Weimann, Klettgau, Fed. Rep. of Germany, assignor to Georg Fischer AG, Schaffhausen, Switzerland

Filed Jan. 3, 1989, Ser. No. 292,772

Claims priority, application Switzerland, Jan. 8, 1988, 00058/88

Int. Cl.[4] B22C *15/00*

U.S. Cl. 164—154 **6 Claims**



1. An apparatus for compacting granular molding material comprising: a pattern plate, a molding box having a plurality of peripheral sidewalls mounted on said pattern plate, a filling frame mounted on said peripheral sidewalls and a pressure chamber on said filling frame wherein said pattern plate, said molding box, said sidewalls and said pressure chamber together define a mold cavity for receiving said granular molding material and compression means associated with the outer surface of said plurality of peripheral sidewalls exterior of said mold cavity for applying pressure to substantially the entire area of said sidewalls in opposition to pressure in said mold cavity said compression means comprises a compression beam associated with each of said sidewalls and having substantially the same surface area as said sidewalls, motor means for biasing said compression beam toward and away from said sidewall, and a pressure sensor between said compression beam and said motor means wherein said compression beams comprise a chamber for receiving a fluid medium under pressure from a source upon the sensing of an increase in pressure within the mold cavity by said pressure sensor.

4,878,535

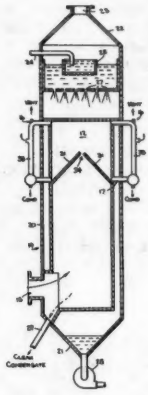
SELECTIVE CONDENSATION APPARATUS

Axel E. Rosenblad, Seabright, N.J., assignor to Rosenblad Corporation, Princeton, N.J.

Filed Apr. 27, 1988, Ser. No. 186,639

Int. Cl.[4] F28B *1/00*; B01D *1/22*

U.S. Cl. 165—114 **5 Claims**



1. A falling film surface condenser for selective condensation of vapor comprising at least one plate element including a pair of plates joined around their peripheries and spaced apart throughout substantially all of the area defined within said peripheries so as to allow for the flow of vapor through the plate element; a slanting internal partition located between and joining the plates across part of the width of the plate element from an upper partition end spaced from said peripheries to a lower partition and sealingly secured at a side edge of the plate element, said partition separating upper and lower internal spaces within the plate element, means for introducing vapor to be condensed in said plate element, and at least two outlet means for condensates formed by vapor condensing within the plate element and a liquid coolant distribution means located above the plate element such that the vapor passes in countercurrent flow to the liquid coolant distributed to said plate element.

4,878,536

COMBINED FILTER AND HEAT EXCHANGER

Stig Stenlund, Saltsjöbaden, Sweden, assignor to Hypeco AB, Malmo, Sweden

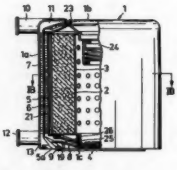
PCT No. PCT/SE88/00053, § 371 Date Jul. 28, 1988, § 102(e) Date Jul. 28, 1988, PCT Pub. No. WO88/06228, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 12, 1988, Ser. No. 224,946

Claims priority, application Sweden, Feb. 16, 1987, 8700627

Int. Cl.[4] F01M *5/00*; F28D *7/10*

U.S. Cl. 165—119 **12 Claims**



1. An arrangement for simultaneously filtering a first me-

dium and effecting a heat exchange between said first medium and a second medium, comprising a filter section and a heat-exchange section, of which the filter section includes a substantially cylindrical tubular filter element (2) and the heat-exchange section has also a substantially cylindrical tubular form and the filter section and the heat-exchange section are located mutually coaxially within an outer casing (1) having a cylindrical peripheral wall (1*a*) and end walls (1*b*, 1*c*) connected to respective axial ends of said peripheral wall, said outer casing being provied with a first inlet (8) and a first outlet (4) for said first medium and with a second inlet (10) and a second outlet (12) for said second medium, characterized in that the heat-exchange section is located coaxially outwardly of the filter element (2) in an annular space defined between the filter element and the cylindrical casing wall (1*a*) and includes a substantially cylindrical, liquid-impervious partition wall (5) which subdivides said space into two separate chambers (6, 7), of which the first chamber (6) is located between the partition wall (5) and the filter element (2) and is arranged to be passed through by said first medium, whereas the second chamber (7) is located between the partition wall (5) and the cylindrical casing wall (1*a*) and communicates with said second inlet (10) and said second outlet (12) for said second medium so as to be passed through by said second medium, said first chamber (6) incorporating a large number of flow channels for said first medium extending in a peripheral direction close to said partition wall (5) and a smaller number of axially extending main flow channels of a first kind (18) and a second kind (20) located alternately at a pripheral distance from one another, said main channels communicating with all said peripherally extending flow channels and being separated from one another by a substantially cylindrical sleeve (21) inserted between the peripherally extending flow channels and the outer surface of the filter element (2) and surrounding the filter element (2), said substantially cylindrical sleeve (21) defining on its radially outwardly facing side said axial main channels of a first kind (18) and separating them from the outer surface of the filter element (2) and defining on its radially inwardly facing side said axial main channels of a second kind (20), which extend along the outer surface of the filter element (2) and communicate with said peripherally extending flow channels through openings (22) provided in said sleeve (21), a flow passage being provided at one axial end of said tubular filter element (2) between a space enclosed by the filter element and said main channels of a first kind (18), said flow passage including pressure relief valve means (23, 24) for opening said flow passage only when the pressure drop across the filter element (2) for said first medium exceeds a predetermined value, and said first inlet (8) and said first outlet (4) being provided in the casing end wall (1*c*) at the opposite axial end of the filter element (2) and communicating with either of said main channels of a first kind (18) and said space enclosed by the filter element (2).

4,878,537

HEAT EXCHANGER FOR PHYSIOLOGICAL FLUIDS

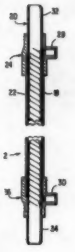
Wesley H. Verkaart, Duxbury, Mass., assignor to Level 1 Technologies, Marshfield, Mass.

Continuation-in-part of Ser. No. 866,910, May 27, 1986, Pat. No. 4,759,749. This application May 26, 1987, Ser. No. 53,637

Int. Cl.[4] A61F *7/12*

U.S. Cl. 165—156 **13 Claims**

1. A heat exchanger capable of maintaining sterility during temperature variation comprising an inner conduit, an outer conduit partially covering said inner conduit and forming a fluid flow channel between an outer surface of said inner conduit and an inner surface of said outer conduit, and end cap means for securing and fluid sealing one end of said outer conduit and for communicating a first fluid with said channel, wherein said inner conduit has a thermal coefficient of expansion larger than that of said outer conduit and said outer conduit is elastic for at least partially accommodating expansion or contraction of said inner conduit, and wherein said end cap means is elastic for at least partially accommodating expansion or contraction of said inner conduit and comprises a first hollow portion cemented to said one end of said outer conduit and a second hollow portion having a hoop strength adequate to tightly grip said outer surface of said inner conduit to provide a pressure tight seal between said second hollow portion and



said inner conduit and to provide a location of said pressure tight seal which remains substantially fixed with respect to said inner conduit during normal thermal expansion or contraction of said inner conduit.

4,878,538

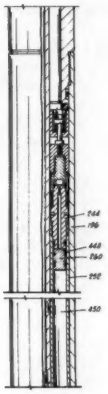
PERFORATE, TEST AND SAMPLE TOOL AND METHOD OF USE

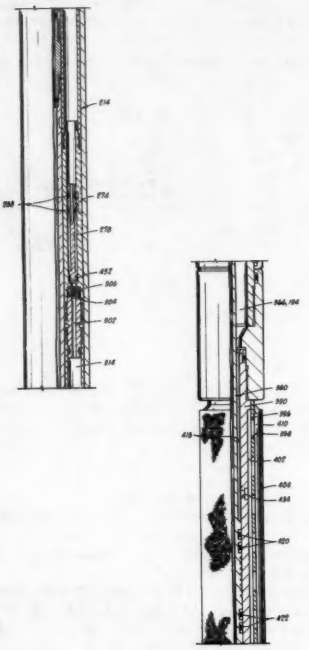
Jon B. Christensen, Ankeny, Iowa, assignor to Halliburton Company, Duncan, Okla.

Continuation of Ser. No. 244,627, Sep. 12, 1988, abandoned, which is a continuation of Ser. No. 64,285, Jun. 19, 1987, abandoned. This application Feb. 15, 1989, Ser. No. 312,323

Int. Cl.[4] E21B *49/08*

U.S. Cl. 166—264 **20 Claims**





9. A downhole tool for testing fluid from a formation reservoir in a well, said tool comprising:

a packer connectable to a tool string and sealingly engageable with a well bore such that a first well annulus is defined above the packet and a second well annulus is defined therebelow;

a cylinder adjacent said packer and defining a central opening therethrough;

an operating piston slidably disposed in said central opening of said cylinder;

a fluid sampler disposed below said packer and defining a sampling chamber and a sample port therein in communication with said second well annulus, said sampling chamber having no communication with said tool string; and

a valve connected to said piston for movement therewith and slidably disposed in said sampler for opening and closing said sampler port.

4,878,539

METHOD AND SYSTEM FOR MAINTAINING AND PRODUCING HORIZONTAL WELL BORES

Edward O. Anders, Kerrville, Tex., assignor to Anders Energy Corporation, Conroe, Tex.

Filed Aug. 2, 1988, Ser. No. 227,197
Int. Cl.[4] E21B *37/00, 43/24, 43/25*
U.S. Cl. 166—303 **35 Claims**

2. Apparatus for completing a well in a subsurface oil bearing formation, the well including a lower, generally horizontal section which extends into the formation; which comprises:

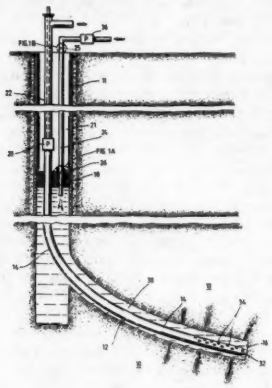
a dual packer set in the well above the formation;

a first tubing string extending down through a first passageway in the packer and substantially into the generally horizontal section in the formation; said first tubing string being closed at its lower distal end and defining a plurality of perforations proximate the distal end;

a pump in the first tubing string above the packer operable to pump liquid up the well; and

a second tubing string extending from the earth's surface down the well through a second passageway in the packer and terminating below the packer.

17. A method of recovering oil from a subsurface oil-bearing formation by means of a well which has a vertically disposed well section extending down from the surface of the earth, and a laterally disposed well section which extends into the formation generally along the bedding planes of the formation to a distal end within the formation, comprising:



transmitting oil produced from the formation into the laterally disposed section from the distal end of the laterally disposed section through a first separate fixed passageway extending from the distal end of the laterally disposed section to the earth's surface; and

transmitting fluid down a second separate fluid passageway from the earth's surface to a point above the laterally disposed section.

4,878,540

APPARATUS AND PROCESS FOR PUMPING FLUID FROM SUBTERRANEAN FORMATIONS

William M. Raymond, P.O. Box 48788, Wichita, Kans. 67201

Filed Jun. 22, 1988, Ser. No. 210,701
Int. Cl.[4] E21B *43/12*
U.S. Cl. 166—369 **12 Claims**

1. An apparatus for pumping fluid from a subterranean reservoir comprising:

(a) a well casing means extending from a surface of the earth down to a subterranean reservoir, said well casing means having at least one casing perforation wherethrough fluid enters therein from said subterranean reservoir;

(b) a hollow tubing means having a known tubing diameter and disposed generally concentrically within said well casing means down to a predetermined depth;

(c) a generally cylindrical hollow housing having a housing diameter and a housing side wall is secured to the bottom of said hollow tubing means and is generally concentric therewith;

(d) a motor means disposed at the bottom of said hollow housing;

(e) a pump means disposed within said hollow housing above said motor means;

(f) a common shaft means connected to said motor means and said pump means for interconnecting the motor means with the pump means such that the shaft means can transfer rotary power from the motor means to the pump means, said housing side wall immediately opposed to said common shaft means having a structure defining a plurality of apertures wherethrough subterranean fluids pass;

(g) a partition means disposed within said hollow housing

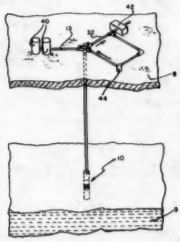
above said pump means, said partition having a partition aperture wherethrough subterranean fluids are pumped by said pump means;

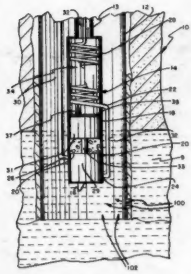
(h) an entrance conduit means extending from the surface of the earth down to the motor means and through the housing side wall in order to connect with the motor means, said entrance conduit means being disposed between said well casing means and said hollow tubing means; and

(i) a return conduit means extending from said motor means, through the housing side wall, upwardly between the housing side wall and said wall casing means, through the housing side wall above said partition means, and through the hollow housing above said partition means, and through the tubing means to the surface of the earth.

5. A process for pumping fluid from a subterranean reservoir to a surface of the earth comprising the steps of:

(a) descending a refrigerant working fluid between a well casing means and a well tubing means;





(b) passing the refrigerant working fluid into a lower part of a housing secured to the bottom of the well tubing means;

(c) cooling the refrigerant working fluid in the lower part of the housing;

(d) passing the cooled refrigerant working fluid of step (c) out of the lower part of the housing;

(e) heating the cooled refrigerant working fluid of step (d);

(f) passing the heated refrigerant working fluid of step (e) into an upper part of the housing, said refrigerant working fluid of steps (a)–(e) being at a pressure and temperature such as to be in a liquid state;

(g) heating the heated refrigerant working fluid of step (f) in the upper part of the housing in order to vaporize the refrigerant working fluid into a vapor; and

(h) ascending the vapor of step (g) through the well tubing means to the surface of the earth.

4,878,541

HORSESHOE, ESPECIALLY FOR TROTTING HORSES

Palle Pedersen, Nymarksgade 31, DK-5474 Veflinge, Denmark

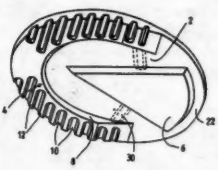
PCT No. PCT/DK87/00095, § 371 Date Mar. 30, 1988, § 102(e) Date Mar. 30, 1988, PCT Pub. No. WO88/00793, PCT Pub. Date Feb. 11, 1988

PCT Filed Jul. 27, 1987, Ser. No. 174,795

Claims priority, application Denmark, Jul. 30, 1986, 3610/86

Int. Cl.[4] A01L *5/00*

U.S. Cl. 168—4 8 Claims



1. A horseshoe, primary for four legs of trotting horses, and consisting of a wear-resistant plate element of resiliently bendable plastic, the underside of which is provided with downwardly projecting portions, characterized in that the horseshoe includes a thin plate element for covering an entire hoof surface and is provided with two mutually separated thickened areas including a first, arched area extending along an outer rim portion of a front half of the thin plate element and being provided with transverse grooves which extend over only a part of the thickened arched area so as to leave an unbroken rib portion extending in parallel to the outer rim portion of the thin plate element, as well as a number of transverse rib portions, and a second, primarily triangular area extending rearwardly with an increasing width from a front end area situated in front of a transverse middle line of the horseshoe, such that the triangular area is connected with a rear end of the first arched area through a connection area of a material of the thin plate element.

4,878,542

SOD LAYING METHOD

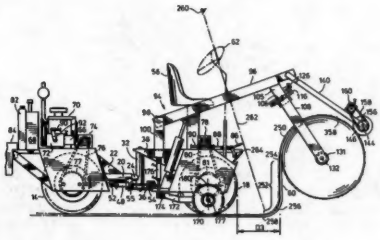
Gerardus J. Brouwer, Keswick, and Henry Zwambag, Sutton, both of Canada, assignors to Brouwer Turf Equipment Limited, Keswick, Canada

Division of Ser. No. 776,242, Sep. 16, 1985, Pat. No. 4,754,815. This application Apr. 5, 1988, Ser. No. 177,760

Claims priority, application Canada, Sep. 17, 1984, 463424

Int. Cl.[4] A01B *45/00*

U.S. Cl. 172—1 8 Claims



1. A method of laying sod comprising:

(a) employing a roll of sod having the grass side of said sod facing outwardly,

(b) supporting said roll of sod above the ground,

(c) carrying said roll of sod in a direction to unwind said roll of sod with the grass side of said sod facing upwardly,
(d) and laying the unwound portion of said sod on the ground.

4,878,543

METHOD FOR CONTROLLING AN ATTACHMENT TO AGRICULTURAL TRACTORS

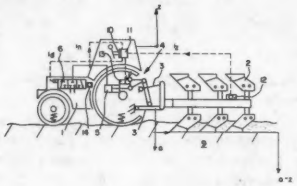
Wolfgang Kauss, Lohr-Wombach, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr/Main, Fed. Rep. of Germany

Continuation of Ser. No. 712,258, Mar. 15, 1985, abandoned. This application Apr. 20, 1987, Ser. No. 45,263

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1984, 3409604; Jan. 19, 1985, 3501568

Int. Cl.[4] A01B *63/11*

U.S. Cl. 172—2 **15 Claims**



1. A method of controlling an attachment connected to an agricultural tractor via a power lift without measuring the pulling force, comprising the steps of:
detecting or determining the absolute vertical movement of the attachment by a motion sensor;
generating signals corresponding to the absolute vertical movement of the attachment and the relative position of the attachment with respect to the tractor; and
directly applying or utilizing the sensed absolute vertical movement and the relative position between the attachment and the tractor in the form of values of these signals as feedback signals for an attachment control circuit.

4,878,544

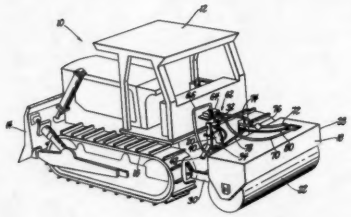
COMPACTION ROLLER

James Barnhart, 6144 Columbia, Haslott, Mich. 48840

Filed Apr. 20, 1988, Ser. No. 183,823

Int. Cl.[4] A01B *29/02, 35/18*

U.S. Cl. 172—40 **13 Claims**



1. A compaction roller machinery assembly (10) for compacting surfaces such as sand, said assembly (10) comprising; a vehicle (12) having a power plant for driving said assembly (10), roller means (18) extending in a cantilevered fashion from a pivot axis on said vehicle (12) for compacting a surface, said roller means (18) including a housing (28), roller lift means (20) mounted to said vehicle (12) and interconnecting said roller means (18) and said vehicle (12) for raising and lowering said roller means (18) about said pivot axis between a raised position and a surface-engaged position, said roller lift means (20) including a hydraulic cylinder (32) having a piston moveable therein between first and second positions and a rod (34) extending from the piston exteriorly of the cylinder (32) and a piston delivery passage (36) for providing positive fluid pressure to one side of the piston in said cylinder (32) to move said rod (34) to its extended position and a piston return passage (38) for providing positive fluid pressure to the other side of said piston in said cylinder (62) to move said rod (34) to its retracted position to lift said roller means (18), said roller lift means (20) further including a cylinder support means (40), said cylinder (32) pivotally connected at one end to said cylinder support means (40), said housing (28) including a mounting bracket (48), said rod (34) pivotally connected at the distal end to said bracket (48), said hydraulic cylinder (32) raising said vibratory compaction roller means (18) to said raised position when said rod (34) is moved to its retracted position and lowering said roller means (18) to said lowered position once said rod (934) is moved to its extended position, said roller means (18) including a roller (22) for rolling and compacting surfaces and vibration-producing means (24) for vibrating said roller (22) to facilitate the compaction of the surfaces, said assembly (10) characterized by including a first hydraulic pump means for supplying said roller lift means (20) with hydraulic power for raising and lowering said roller means (18) and a second hydraulic pump means (26) disposed on said vehicle (12) for supplying hydraulic power to said hydraulic vibration-producing means (24) on said roller means (18) to vibrate said roller (22) to facilitate the compaction of the surface.

4,878,545

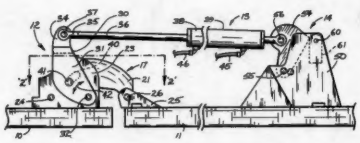
AGRICULTURAL IMPLEMENT WITH FOLDABLE WING

Ray Dyken, Coaldale, Canada, assignor to Victory Equipment (1983) Limited, Alberta, Canada

Filed Jun. 15, 1987, Ser. No. 62,510

Int. Cl.[4] A01B *17/00*

U.S. Cl. 172—776 **20 Claims**



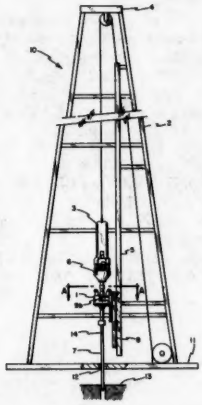
1. An implement including a first frame and a wing frame connected to said first frame by hinge means to permit pivoting of said wing frame a lowered operating position to a raised transport position relative to said first frame; said hinge means including a hinge member having a first pivot means connecting said hinge member to said first frame and allowing turning movement of said hinge member about a horizontal axis relative to said first frame and a second pivot means connecting said hinge member to said wing frame and allowing turning movement of said wing frame relative to said hinge member about a second horizontal axis spaced from and parallel to the axis of first pivot means, and locking means movable between locking and unlocking positions, said locking means in the unlocking position permitting the turning movements of both said pivot means whereby said wing frame in said operating position is free for limited float upward and downward relative to said first frame, lock actuating means operable when said wing frame is in said operating position for moving said locking means to said locking position for preventing the turning movement about one of said first and second pivot means, and a wing frame raising means operable after operation of said lock actuating means for pivoting said wing frame about the other of said first and second pivot means to the transport position.

4,878,546

SELF-ALIGNING TOP DRIVE

Danial G. Shaw, Conroe, and Billy MacCline, Porter, both of Tex., assignors to Triten Corporation, Houston, Tex.

Filed Feb. 12, 1988, Ser. No. 155,300
Int. Cl.[4] E21B *3/00*
U.S. Cl. 173—163 **6 Claims**



1. A self-aligning top drive apparatus for well operations with tubulars suspended from a derrick, the top drive apparatus mountable to the derrick, the derrick having a central derrick vertical axis, the top drive apparatus comprising

top drive means,

gimbal mean to which the top drive means is movably mounted,

the movable mounting of the top drive means to the gimbal means providing for movement of the top drive means at right angles to the central derrick vertical axis and also for tilting movement with respect to said axis to maintain the top drive means in alignment with the tubulars,

a first pivot pin extends from a first side of the top drive means and a second pivot pin extends from a second side of the top drive means opposite to the first side, and the gimbal means comprising

a gimbal frame disposed about the top drive means,

the gimbal frame having two holes therein one each for receiving one of the two pivot pins, each of the pivot pins slidable and rotatable in its respective hole,

a gimbal pin secured to the gimbal frame,

a gimbal frame support disposed about the gimbal frame, the gimbal frame support having an opening therethrough for receiving the gimbal pin,

the gimbal pin slidably and movably extending through the opening in the gimbal frame support,

dolly means movably mounted for upward and downward movement in the derrick, and

gimbal mount means for securing the gimbal means to the dolly means.

4,878,547

ROCK DRILLING APPARATUS

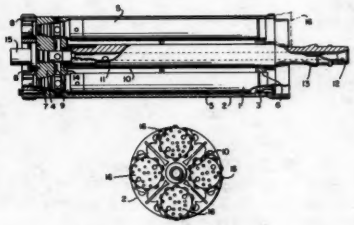
Archie A. Lennon, Troutville, Va., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Continuation of Ser. No. 264,016, Oct. 28, 1988, abandoned. This application Jun. 21, 1989, Ser. No. 368,904
Int. Cl.[4] E21B *04/16*
U.S. Cl. 175—53 **11 Claims**

1. A gang drill for increasing the diameter of bored holes in hard rock comprising:

a plurality of individual percussion producing rock drills in a cylindrical drill body, said body having a rearward end and a forward end, said forward end having bit ends of said drills exposed for rock cutting arranged peripherally around said body and a drill string connected at the centerline of said drills to said body at its forward end for rotating and drawing said drills through a previously drilled bore hole to enlarge said previously drilled hole;

said body totally encloses said drills, said body being further provided with alignment means, securing means, and means for supplying pressure fluid for each of said drills,



said pressure fluid entering said drills internally of said body and exiting said drills externally to said body at its forward end, whereby said body forms a peripheral passage for exiting of rock cuttings and provides protection for individual drills; and

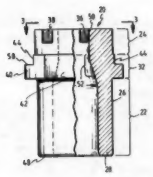
said means for supplying pressure fluid from said forward end of said body comprises a center core rod of approximately the same dimensions as an individual percussive drill allowing substitution for same and thereby providing for reversal of the direction of drilling of said gang drill.

4,878,548

NOZZLE RETENTION SYSTEM FOR A DRILL BIT

Alfred Ostertag, Celle, Fed. Rep. of Germany; Robert E. Iversen, Humble, Tex.; Craig R. Hyland, Magna, Utah; Kenneth D. Enever, Lisses, France, and Steven R. Radford, South Jordan, Utah, assignors to Eastman Christensen, Salt Lake City, Utah

Filed Jan. 21, 1988, Ser. No. 146,377
Int. Cl.[4] E21B *10/18, 10/60*
U.S. Cl. 175—340 **16 Claims**



1. A drill bit, comprising:

a body member, said body member having a bore for receiving a nozzle, said bore having a profile forming a keyway;

a nozzle, said nozzle including a key portion adapted to selectively engage said keyway in a first position to retain said nozzle within said bore of said body member, and to disengage said keyway in a second position to disengage said nozzle from said body member; and

a spring disposed generally coaxially with said nozzle, and externally relative to said nozzle, and adapted to exert a

force on said nozzle to selectively retain said nozzle in said first position.

12. A drill bit, comprising:

a body member, said body member having a bore for receiving a nozzle, said bore having a profile forming a keyway;

a nozzle, said nozzle including a key portion which allows said nozzle to be inserted into said keyway in a first position, and which allows said nozzle to engage said keyway in a second position after the insertion of said nozzle within said bore of said body member, said nozzle being adapted to pass a pressurized fluid through said body member;

means for resiliently forcing said key portion of said nozzle into engagement with said keyway in said second position to retain said nozzle within said bore; and

means for isolating said forcing means from said pressurized fluid.

4,878,549

WIRE LINE CORE BARREL

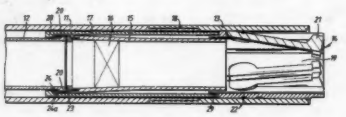
Andrew H. Bennet, deceased, late of Newcastle-upon-Tyne, England (by David H. Davies, executor), assignor to Diamant Boart Cralius Ltd., Daventry, England

Continuation-in-part of Ser. No. 135,500, Dec. 18, 1987, abandoned, which is a continuation of Ser. No. 882,235, Jul. 7, 1986, abandoned. This application Oct. 12, 1988, Ser. No. 256,509

Claims priority, application United Kingdom, Jul. 9, 1985, 8717388

Int. Cl.[4] E21B *25/04*

U.S. Cl. 175—248 **5 Claims**



1. A core sampling device for connection to a drilling machine through at least one drilling rod and an outer barrel attached to the drilling rod most distant from said drilling machine, said sampling device comprising a drill bit assembly, a generally cylindrical drive shoe drivingly coupled to said outer barrel and arranged to house said drill bit assembly, and a core sample tube; said drill bit assembly including a bit housing and a series of drill segments; said bit housing including first engagement means on an external surface thereof and said drive shoe including second engagement means on an internal surface thereof, whereby, when said bit housing is located within said drive shoe, said first and second engagement means engage each other so that when rotational force from said drilling machine is applied to said drive shoe via said drilling rods and said outer barrel, said bit housing is drivingly engaged by said drive shoe through the first and second engagement means; each drill segment comprising an elongate body having a laterally enlarged head at one end and the enlarged head having a rear surface formed with a convexly curved engagement section and a cutting portion at the other end, said cutting portion having an inner radial limit and an outer radial limit; said bit housing having a series of elongate slots, each slot being open at one end of said bit housing and having a laterally enlarged recess at the other end thereof and each recess defining a concavely curved internal support section around its front side conforming to the convexly curved engagement section; each drill segment being located with its elongate body within one of said elongate slots and with said curved engagement section slidably engaged with said curved support section of said recess to define a curved hinge profile whereby each drill segment is capable of pivoting, without any translation movement, relative to said bit housing between a drilling position, in which said outer and inner radial limits of said cutting portions define the outer and inner diameter of an annular hole to be drilled, and a retracted position in which said cutting faces are entirely within the diameter of said generally cylindrical drive shoe; said drill segments being maintained in said drilling position with said elongate bodies held in said elongate slots by means of said core sampling tube when said core sampling tube is in a forward position within said bit housing; means surrounding the bit housing and elongate bodies of the drill segments to maintain said engagement section in sliding engagement with said support section and said segments being allowed to adopt said retracted position with said elongate bodies extending into the interior of said bit housing when said sampling tube is withdrawn; said core sampling tube engaging said drill bit assembly whereby continued withdrawal of said core sampling tube causes withdrawal of said drill bit assembly from within said drive shoe.

4,878,550

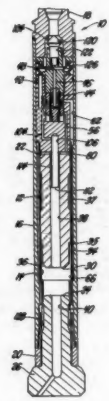
PILOT-VALVE-CONTROLLED PERCUSSION DRILLING TOOL

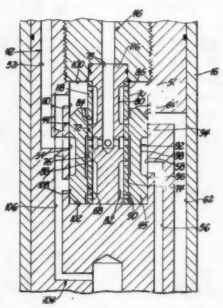
Jo-Yu Chuang, Sugarland, Tex., assignor to Sandvik Rock Tools, Inc., Bristol, Va.

Filed Jul. 15, 1988, Ser. No. 219,394

Int. Cl.[4] F21B *4/14*; F01L *15/00*

U.S. Cl. 175—296 **24 Claims**





24. A down-hole drilling tool of the type for boring into the earth and supplied with a pressurized fluid flow to operate said tool for increasing boring rate, said drilling tool comprising: impact means moved by the fluid flow toward and away from an impact position for producing an impact force; conduit network means for conducting the fluid flow to said impact

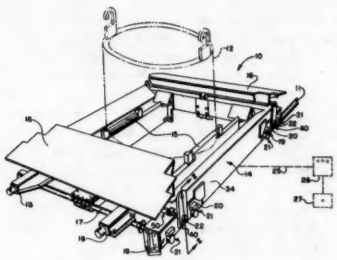
means; and control valve means in said conduit network means for controlling fluid flow to said impact means, at least a portion of said control valve means being movable between a first position for directing fluid flow in said conduit network means to move said impact means toward said impact position and a second position for directing the fluid flow in said conduit network means to move said impact means (12) away from said impact position, said portion of said control valve means being responsive to fluid flow in said conduit network means for continuously cycling between said first and second positions; said drilling tool characterized by said conduit network means including a tap in the fluid flow to said impact means and pilot passage means continuously conveying pilot fluid pressure from said tap in said conduit network means to said control valve means, said control valve means being responsive to said pilot fluid pressure for continuously cycling between said first and second positions independently of the fluid flow after said tap.

4,878,551

LADLE TRANSFER CAR WITH WEIGHING SYSTEM

Donald M. Watkins, Beloit; Tryon V. Huggett, Chagrin Falls, and Judson F. Martt, Youngstown, all of Ohio, assignors to Steel Equipment Specialists, Inc., Alliance, Ohio

Filed Nov. 18, 1988, Ser. No. 273,357
Int. Cl.[4] G01G *19/08, 3/14*
U.S. Cl. 177—139 **12 Claims**



1. A ladle transfer car for transporting a ladle and its contents along a surface and weighing such ladle and the contents thereof, said ladle transfer car including a car body for supporting such ladle and multiple truck assemblies for supporting said car body upon such surface and at least one load sensor for use in determining the weight of such ladle and the contents thereof, said at least one load cell sensor comprising a shear beam load cell pin connecting said car body to said truck assembly which is capable of sensing a load and transmitting an electrical signal for use in determining the weight of such ladle and its contents, each of said truck assemblies connected to said car body with a stabilizer assembly which limits the relative horizontal movement between each of said truck assemblies and said car body, said stabilizer assemblies each comprising a pivot arm extending substantially perpendicular to the major axis of said truck assemblies, said pivot arm pivotally connected at one end to said car body and pivotally connected at the other end to said respective truck assembly.

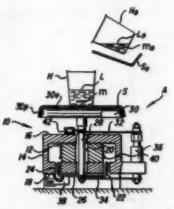
4,878,552

SHIELDING MEANS FOR USE WITH ELECTROMAGNETIC BALANCE

Charles H. Gebo, and Bradley C. Roth, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 21, 1988, Ser. No. 274,171
Int. Cl.[4] G01G *7/00, 21/22*
U.S. Cl. 177—212 **15 Claims**

1. In combination with weighing apparatus of the electromagnetic-load-compensation type, such apparatus including stationery magnet means located within the apparatus and having an air gap, a compensation coil operatively disposed for movement in said gap, carrying means supporting said coil and mounted for movement relative to said stationary magnet means away from and back to an initial position, and means responsive to carrying means movement away from said initial position for supplying current to said coil to return said carrying means to said position, said carrying means being adapted to support a load to be weighed, an improvement adapted to



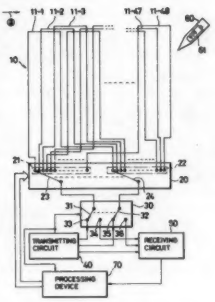
render such apparatus immune to interference by magnetic flux from a source thereof external to the apparatus, said improvement comprising protective shield means configured to be placed between said carrying means and said source of magnetic flux, so as to be in flux-transmitting relation to said source, for shielding the apparatus from said flux, said shield means being formed from ferromagnetic material having sufficient permeability to provide a path of least reluctance for transmitting said flux and thereby preventing said flux from interfering with intended operation of the apparatus.

4,878,553

POSITION DETECTING APPARATUS

Tsuguya Yamanami, Okegawa; Takahiko Funahashi, Kuki, and Toshiaki Senda, Okegawa, all of Japan, assignors to Wacom Co., Ltd., Saitama, Japan

Filed Sep. 14, 1987, Ser. No. 95,702
Claims priority, application Japan, Sep. 12, 1986, 61-213970
Int. Cl.[4] G08C *21/00*
U.S. Cl. 178—18 **7 Claims**



1. A position detecting apparatus comprising:
a tablet;
a position pointer, at least one signal being transmitted and received between said position pointer and said tablet, and a position designated with said position pointer being detected;
a tuning circuit provided in said position pointer;
an electric wave generating means for sending an electric wave to said tuning circuit, said tuning circuit resonating with the electric wave from said electric wave generating

means to generate another electric wave to be sent to an electric wave detecting means;

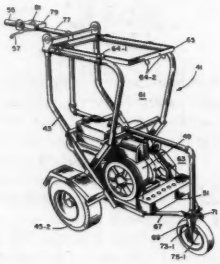
wherein coordinates values corresponding to said position designated with said pointer on said tablet are detected via said electric wave detecting means.

4,878,554

MOTORIZED MAIL CART

Donald D. Dion, 270 Newport Ave., South Attleboro, Mass. 02703

Filed Aug. 31, 1987, Ser. No. 90,848
Int. Cl.[4] B62D *51/04*
U.S. Cl. 180—19.3 **4 Claims**



1. A cart for transportation of bags of mail and the like comprising:

a. a frame adapted to hold a plurality of mail bags and adapted to hold a compartment for additional storage of mail, the frame having a top portion and a bottom portion, the top portion having a top section which is rectangular in shape, the top portion being constructed to hold a mail tray and including four sets of spaced apart hooks each of to which may be attached a mail bag, the bottom portion having a bottom surface,

b. an axle mounted on the frame for rotational movement,

c. a pair of wheels fixedly mounted on the axle,

d. a third wheel mounted on the bottom surface of the bottom portion to provide additional stability to the cart,

e. an internal combustion motor,

f. means for connecting the motor to the axle,

g. a battery for supplying an initial electrical current to the motor,

h. a starter/generator interconnecting the motor to the battery for relaying the initial electrical current from the battery to the motor, for re-circulating electrical current to the motor and for recharging the battery,

i. a handle mounted on the frame for steering the cart,

j. a throttle disposed within the handle and actuated by twisting said handle for varying the revolution speed of the motor,

and

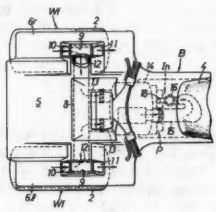
m. brake means for selectively slowing down movement of the cart, the brake means comprising a hand brake lever situated under the handle so that said hand brake lever and the handle can be grasped together with one hand in order to facilitate pulling said hand brake lever upward, a friction-based assembly situated on both sides of the third wheel, and a cable extending from the hand brake lever to the friction-based assembly which causes the friction-based assembly to engage with the third wheel when the hand brake lever is pulled upwards.

4,878,555

AIR INTAKE DEVICE FOR A VEHICLE ENGINE

Osamu Yasunaga, Saitama; Kazuharu Wakusaka, Tokyo; Fumio Inomata, and Toshio Tsuchiya, both of Saitama, all of Japan, assignors to Honad Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 808,003, Dec. 12, 1985, abandoned. This application Sep. 30, 1987, Ser. No. 104,543
Claims priority, application Japan, Dec. 13, 1984, 59-263666; Jul. 2, 1985, 60-145224; Jul. 19, 1985, 60-159464
Int. Cl.[4] B60K *13/02*
U.S. Cl. 180—68.3 **15 Claims**



1. An air intake device for an engine in a vehicle including a body provided with a front wheel, an engine carried on said vehicle body, an air cleaner connected to an intake pipe of the engine and disposed above the engine, and a front fender provided at a front portion of said vehicle body to cover an upper surface of said front wheel, said upper front fender having an upper surface, comprising an air intake chamber of a predetermined volume provided on said upper surface of the front fender defining a closed channel extending generally in the direction of movement of the vehicle having top, bottom, and side walls, and having at least one intake port, said one intake port opening to the vehicle and a conduit connecting said air intake chamber to an inlet of the air cleaner, said conduit including an air induction passage extending from said air intake passage to the air cleaner of said engine, said air induction passage joining with said air intake passage at a first end of said air induction passage to define a port through a side wall of said air intake passage at a substantial angle to the flow direction of said air intake passage, said port having a cross sectional area substantially less than the transverse cross sectional area of said air intake passage at said port the intersection of said port with a side wall of said air intake passage being spaced above said bottom wall.

4,878,556

VEHICLE STEERING SYSTEMS

David L. Wells, Houston, Tex., assignor to Stewart & Stevenson Services, Inc., Houston, Tex.

Filed Sep. 11, 1987, Ser. No. 96,163
Int. Cl.[4] B62D *7/14*
U.S. Cl. 180—140 **21 Claims**

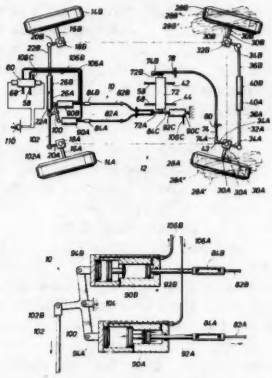
1. In combination with a steering system for a vehicle having steerable front and rear road wheels of the type wherein a steering wheel for turning the front road wheels to an angular quantity, and a hydraulic actuator means for automatically turning the rear road wheels through an angle proportional to the turning of the front road wheels to operably provide a vehicle steering system having at least two steering modes for the front and rear road wheels, the improvement which comprises:

a rear mechanical means for signaling an angular quantity of the turning of the rear road wheels to said hydraulic actuator means,

a first front mechanical means for signaling an angular quantity of the turning of the front road wheels to said hydraulic actuator means,

said hydraulic actuator means turning the rear road wheels

until said rear mechanical means signals said hydraulic actuator means that the angular quantity of the turning of the rear road wheels is equal to a proportional angular quantity of the turning of the front road wheels signaled by said front mechanical means to said hydraulic actuator means, and



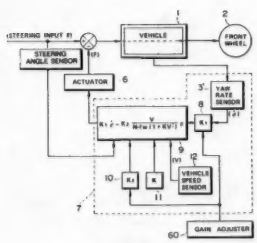
a first hydraulic coupling means for selectively engaging and disengaging said first front mechanical signaling means and said hydraulic actuator means to control the angular position of said rear wheels with respect to said front wheels.

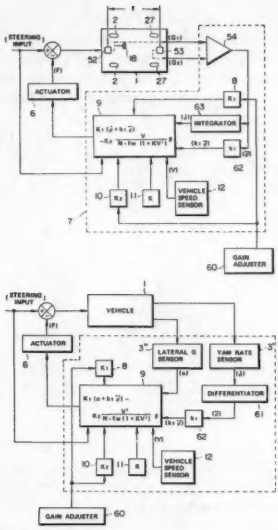
4,878,557

AUXILIARY STEERING SYSTEM FOR WHEELED VEHICLE

Yasuji Shibahata, Yokohama; Yukio Fukunaga, Zushi; Yasumasa Tsubota, Yokosuka; Takaaki Uno, Zama, and Yuji Okuyama, Atsugi, all of Japan, assignors to Nissan Motor Co., Ltd., Japan

Continuation of Ser. No. 38,460, Apr. 16, 1987, abandoned, which is a continuation of Ser. No. 695,344, Jan. 28, 1985, abandoned. This application Feb. 28, 1989, Ser. No. 318,470
Claims priority, application Japan, Jan. 31, 1984, 59-15332
Int. Cl.[4] B62D *5/04, 5/06, 6/02, 6/04*
U.S. Cl. 180—140 **36 Claims**





1. A vehicle comprising:
road wheels;
a steering wheel;
a steering mechanism which steers the vehicle by altering the direction of at least one of said road wheels in accordance with angular displacement of said steering wheel;
a steering angle sensor which senses the angular displacement of said steering wheel;
a vehicle speed sensor which senses the speed of the vehicle;
vehicle behavior sensing means for sensing a variable indicative of actual turning behavior of the vehicle;
negative feedback means connected the said steering angle sensor, said vehicle speed sensor, and said vehicle behavior sensing means for producing a negative feedback signal which is proportional to the difference between a first quantity indicative of actual turning behavior of the vehicle multiplied by a first coefficient and a reference quantity multiplied by a second coefficient, the first quantity being a function of the variable which is sensed by said vehicle behavior sensing means and the reference quantity being determined in accordance with the angular displacement sensed by said steering angle sensor and the vehicle speed sensed by said vehicle speed sensor and being substantially equal to what the magnitude of the variable would be if the vehicle were performing a steady state turning motion with the sensed angular displacement and the sensed vehicle speed; and
actuating means for steering the vehicle by altering the direction of at least one said road wheels in accordance with the negative feedback signal in such direction as to reduce the magnitude of the variable.

4,878,558

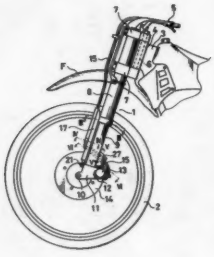
FRONT FORK OF A MOTORCYCLE

Toshimitsu Asakura, Wako, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 26, 1988, Ser. No. 262,589
Claims priority, application Japan, Oct. 28, 1987, 62-270259
Int. Cl.[4] B62J *13/00*
U.S. Cl. 180—219 **7 Claims**

1. A front fork of a bicycle including outer cases disposed above on each side of a vehicle body, inner tubes disposed below on each side of a front wheel and telescopically inserted into said respective outer cases, and brake callipers provided at the rear of the bottom end of said inner tube; characterized in

that said front fork comprises an axle support member connected to said inner tube, a protector having its bottom end fixedly secured to said axle support member for covering the front of at least one of said inner tubes therealong, a hose holding member formed on the front surface of said protector



for holding a brake hose, and a hose guide member for guiding a brake hose portion extending from said hose holding member down to said brake callipers so as to detour by the side of said inner tube along a route having a larger radius than that of said outer case.

4,878,559

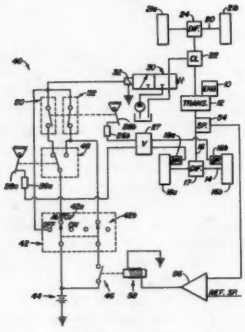
BRAKE SYSTEM FOR FOUR-WHEEL DRIVE VEHICLES

Seaton Moon, and Mark A. Bergene, both of Cedar Falls, Iowa, assignors to Deere & Company, Moline, Ill.

Continuation-in-part of Ser. No. 155,772, Feb. 16, 1988, Pat. No. 4,811,811. This application Oct. 14, 1988, Ser. No. 257,574

Int. Cl.[4] B60K *23/08*

U.S. Cl. 180—244 **13 Claims**



1. In a vehicle having a primary axle driven by an engine via a transmission, first and second drive wheels on the primary axle, first and second service brakes for braking the respective first and second drive wheels, a secondary axle supporting a pair of secondary wheels, a clutch between the engine and the secondary axle, a clutch control means for controlling engagement and disengagement of the clutch, and a mode controller;

the clutch control means comprising:

means for automatically engaging the clutch when both service brakes are applied;

means for engaging the clutch when both service brakes are released; and

means for automatically disengaging the clutch when only one of the first and second service brakes is applied, the clutch control means being operable as a function of a potential applied to an input thereof;

the means for automatically engaging and disengaging comprises a control circuit comprising:

a potential source;

a second potential source;

first switch having a first terminal for connecting to the potential source, a second terminal, a third terminal and a switch element operatively connected to the first service brake to close a circuit between the first and second terminals when the first service brake is released and to close a circuit between the first and third terminals when the first service brake is applied;

a second switch having a first terminal connected to one of the second and third terminals of the first switch, a second terminal connected to the clutch control means and a switch element operatively connected to the second service brake to close a circuit between its terminals when the second service brake is released and to open a circuit between its terminals when the second service brake is applied; and

a third switch having a first terminal connected to the other of the second and third terminals of the first switch, a second terminal connected to the clutch control means and a switch element operatively connected to the second service brake to open a circuit between its terminals when the second service brake is released and to close a circuit between its terminals when the second service brake is applied;

the mode controller being coupled to the clutch control means, the potential source and to at least one of the first, second and third switches, the mode controller having a first state wherein the clutch control means is controlled as a function of the operation of the service brakes, the mode controller also having a second state wherein the clutch control means causes engagement of the clutch regardless of the operation of the service brakes.

4,878,560

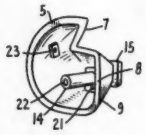
EARMOLD

Robert T. Scott, 416 Lighthouse Ave., Santa Cruz, Calif. 95060

Filed Mar. 16, 1989, Ser. No. 323,994

Int. Cl.[4] H04R *25/00*

U.S. Cl. 181—130 **6 Claims**



1. An integrally formed earmold having thin walls and having an inwardly extending conical portion adapted to fit into a concha and outer portion of an auditory canal, terminating in a rectangular knob with a small flange thereon, said knob sealing off a meatus of an external ear canal without substantially penetrating the external ear canal, said flange anchoring an earmold at the entrance of the external ear canal, and a hollow cylinder extending laterally from said knob a sufficient distance to form a support for a headset, said integrally formed earmold being made of a soft, flexible, elastic plastic.

4,878,561
SOUND EMITTER

Görand Tengstrand, Hägersten; Boris Lindblom; Jerry Nilsson, both of Tyresö, and Peter Lundén, Stockholm, all of Sweden, assignors to Satt Communications AB, Stockholm, Sweden

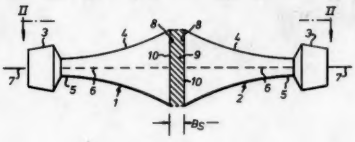
PCT No. PCT/SE86/00571, § 371 Date Jun. 23, 1988, § 102(e) Date Jun. 23, 1988, PCT Pub. No. WO87/03994, PCT Pub. Date Jul. 2, 1987

PCT Filed Dec. 12, 1986, Ser. No. 213,583

Claims priority, application Sweden, Dec. 23, 1985, 8506106-7

Int. Cl.[4] G10K *11/10*

U.S. Cl. 181—188 9 Claims



1. An omnidirectional sound emitter with separate sound sources (1, 2), each comprising a funnel-shaped horn (4) and each sound source (1, 2) having a sound-emitting end opening (8) through which the horn (4) is adapted to direct sound of a predetermined wavelength along an acoustic main axis of the horn (4), said horn emitter being adapted to emit acoustic energy through 360° in a predetermined plane (7), the sound-emitting end openings (8) of said horns (4) being directed toward a central portion of the sound emitter and spaced apart from one another, characterized in that the acoustic main axes of the horns (4) are parallel to said predetermined plane (7), and that separate slot-shaped openings (9), extending perpendicular to said predetermined plane (7) and having a width (B_S) parallel to the plane which is small in relationship to the wavelength of the sound emitted and being spaced a distance (B_H, B_D) from opposed slot-shaped openings (9) which is small in relation to the wavelength of the sound emitted, are so arranged between adjacent end openings (8) of the horns (4) that sound emitted from the end openings (8) of the horns (4) is caused to pass in a direction from the sound emitter through the separate slot-shaped openings (9), thereby to be dispersed in said predetermined plane (7) such that the sound representation by the sound emitter corresponds to sound representation from a line source perpendicular to said plane (7).

4,878,562
GROUP CONTROL FOR ELEVATORS WITH LOAD DEPENDENT CONTROL OF THE CARS

Joris Schroder, Lucerne, Switzerland, assignor to Inventio AG, Switzerland

Filed Oct. 19, 1988, Ser. No. 259,874

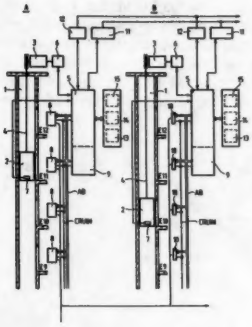
Claims priority, application Switzerland, Oct. 20, 1987, 04103/87

Int. Cl.[4] B66B *1/22*

U.S. Cl. 187—127 8 Claims

1. A group control for elevators with load-dependent control of the cars, including call registering devices arranged on the floors by means of which calls for desired floors of destination can be entered, floor and car call memories assigned to the elevators of the group, which memories are connected with the call registering devices where at the input of calls at a floor a call characterizing the floor of input is stored in the floor call memory and the calls characterizing the floors of destination are stored in the car call memory, load measuring devices provided in the cars of the group of elevators which are connected with load memories, selectors assigned to each elevator of the group indicating in each case the floor of a possible stop, first and second scanners assigned to each elevator of the group exhibiting for each floor at least one position, a device whereby the entered calls of the cars are assigned to the group of elevators and having for each elevator a computer and a comparison device and the computer calculates at every floor designated by the first scanner from data specific to the elevator operating costs corresponding to the waiting times of the passengers, and having an assignment memory and a cost memory and the operating costs of all cars at every position of the second scanner are compared with each other by means of the comparison device and the respective call is assigned to that car which exhibits the smallest operating costs by storage in the assignment memory, and an overload control device comprising:

first circuits assigned to the floors serviced by an elevator car and connected with a selector, a load memory, an



assignment memory and a floor call memory, said first circuits being activated at every position of the selector for preventing the car from servicing an assigned call if at a stop at the associated floor an overload would be generated in the car; and

second circuits assigned to the upward and downward directions for the floors and connected with the selector and said first circuits, said second circuits being connected with each other and activated at every position of the selector, whereby after passing of said associated floor and reaching the point of reversal of the direction of travel, the car travels back to said associated floor without interruption and correspondingly services said assigned call entered there.

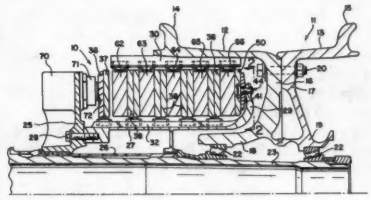
4,878,563
BRAKE APPARATUS

Bradley J. Baden, and John H. Warren, both of Troy, Ohio, assignors to The B.F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 630,622, Jul. 13, 1984, abandoned. This application Apr. 4, 1986, Ser. No. 848,190

Int. Cl.[4] F16D *55/36*

U.S. Cl. 188—71.5 11 Claims



1. A wheel and brake assembly comprising fixed mounting

means, a wheel member operatively connected to said fixed mounting means and rotatable with respect thereto, said wheel member having a plurality of axially extending splines, a torque tube member operatively connected to said fixed mounting means, said torque tube member having a radially outwardly extending annular end portion defining a torque plate, said torque tube having a plurality of axially extending splines, a plurality of primary friction discs carried by said splines on said wheel for rotation therewith, a plurality of secondary friction discs carried by said splines on said torque tube, said primary and secondary discs interleaved to form an axially moveable brake stack, an annular metal backing plate secured to said torque plate, an annular carbon composite friction brake disc mounted on said backing plate and secured thereto, force transmitting means operatively connected to said fixed mounting means for urging said brake stack against said carbon composite brake disc and causing frictional engagement between adjacent discs, means operatively interconnecting said annular carbon composite brake disc to said backing plate to allow radial relief from radial thermal stresses induced therebetween at said interconnecting means.

4,878,565

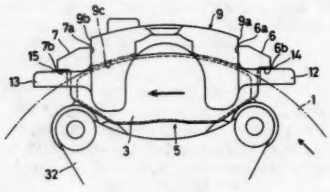
Patent Not Issued For This Number

4,878,564

DISC BRAKE ASSEMBLY

Toshio Kondo, Okazaki, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jul. 28, 1988, Ser. No. 225,203
Claims priority, application Japan, Jul. 29, 1987, 62-115019
Int. Cl.[4] F16D *55/224*
U.S. Cl. 188—73.31 **16 Claims**



1. A disc brake assembly comprising:

a brake disc rotated with a wheel of a body for rotation about an axis extending in an axial direction;

a pair of brake pads disposed with the brake disc therebetween so as to squeeze the brake disc;

a caliper member straddling a portion of the brake disc and having a cylinder portion and a reaction portion on opposite sides of the brake disc, respectively, the caliper member further including a bridge portion straddling outer circumference of the brake pads and the brake disc and connecting the cylinder portion of the reaction portion;

said caliper member having a pair of arm portions formed integrally therewith, extending between the cylinder portion and the reaction portion, and being circumferentially spaced from the bridge portion with respect to the direction of rotation of the brake disc, each of the arm portions having an approximately U-shape and straddling the outer circumference of the brake disc adjacent a respective one of leading and trailing sides of the bridge portion with respect to a direction of rotation of the brake disc;

each of the brake pads having a pair of ear portions extending outwardly from opposite sides of the outer periphery thereof so as to locate the bridge portion therebetween; and

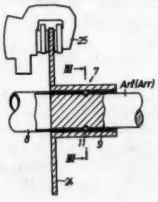
said ear portions being slidably supported on the arm portions for movement in the axial direction of the brake disc and said ear portions on the trailing side of the bridge portion being capable of transmitting brake torque generated at the brake pads to the trailing side surface of the bridge portion.

4,878,566

METHOD AND MECHANISM FOR SELECTIVELY TRANSMITTING AND INTERRUPTING DELIVERY OF POWER

Tetsuro Hamada; Katsuhiko Masuda; Kazunori Shibuya; Kazuhiko Shimada; Etsuo Fujii; Hiroshi Ikegami, and Kunitaka Furuya, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 23, 1987, Ser. No. 112,676
Claims priority, application Japan, Oct. 24, 1986, 61-253465
Int. Cl.[4] F16D *11/02, 67/02*
U.S. Cl. 192—13 R **11 Claims**



1. A mechanism for selectively transmitting and interrupting power between an input shaft and an output shaft arranged in coaxial relation, said mechanism comprising

a rotary member,

means coupling said rotary member with one of said shafts for providing first and second state therebetween in which in said first state the rotary member is free to rotate and

said means provides transmission of rotation between the input and output shafts, whereas in said second state said one shaft can rotate relative to the other said shaft and transmission of rotation is interrupted, said rotary member and said other shaft being angularly rotated relative to one another between first and second relative positions in said second state, and

said coupling means including a ball releasably interposed between said shafts and a spring between said rotary member and said other shaft to permit the relative angular rotation between the rotary member and the other shaft,

said ball in said first state being engaged with said shafts and said spring being relaxed whereas in said second state said ball is released from said one shaft and said spring is under stress,

said one shaft having a recess receiving said ball, said other shaft having a further recess and a projection adjacent to said further recess, said rotary member including a further projection engaged in said further recess in said other shaft, said spring being engaged in said further recess in said other shaft and bearing against said further projection on said rotary member.

4,878,567

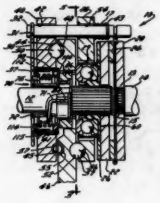
BRAKE/LOCKING DIFFERENTIAL

James A. V. Buckley, Whitefish Bay; Donald D. Brown, Thiensville, and Glenn S. Metzelfeld, Brookfield, all of Wis., assignors to Hayes Industrial Brake, Inc., Mequon, Wis.

Filed Dec. 22, 1987, Ser. No. 136,824

Int. Cl.[4] F16D *67/02, 13/75*

U.S. Cl. 192—18 R **17 Claims**



1. A brake/locking differential assembly for locking a first shaft to a second shaft so that the shafts either rotate as a unit or brake as a unit,

said assembly comprising,

a clutch plate secured to the end of one of said shafts,

a friction plate mounted for axial movement on the end of the other of said shafts and being axially aligned with said clutch plate,

a frame mounted in a fixed relation to said shafts,

a cam plate mounted on said frame in axial alignment with the other of said shafts,

an actuator plate mounted in a parallel relation to said cam plate for pivotal and axial motion on the other of said shafts,

first means located between said cam plate and said actuator plate for moving said actuator plate away from said cam plate when said actuator plate is pivoted in one direction on said shaft,

a thrust bearing mounted on the other of said shafts between said actuator plate and said friction plate,

whereby said actuator plate will move said thrust bearing and said friction plate axially into engagement with said clutch plate when said actuator plate is pivoted in one direction so that said shafts rotate at the same speeds,

a brake ring mounted on said frame between said actuator plate and said friction plate for axial motion with respect to the other of said shafts, and second means located between said actuator plate and

said brake ring for moving said brake ring axially into engagement with said friction plate and said friction plate axially into engagement with said clutch plate on pivotal motion of said actuator plate in the opposite direction whereby said first and second shafts will be locked in a braking mode.

4,878,568

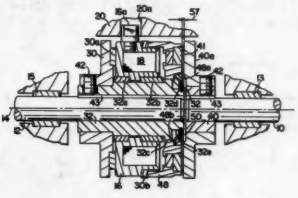
ELECTROMAGNETIC CLUTCH/BRAKE ASSEMBLY

Eric R. Fossum, Simsbury, Conn., assignor to Inertia Dynamics, Inc., Collinsville, Conn.

Filed Mar. 17, 1989, Ser. No. 325,309

Int. Cl.[4] F16D *67/06*

U.S. Cl. 192—18 B **5 Claims**



1. An electromagnetic clutch and brake assembly for coupling input and output shafts that are aligned with one another, said assembly comprising

an input hub defining a clutch armature fixedly mounted therein, said clutch armature defining an annular face,

an output hub defining a flange and having a sleeve portion,

a frame for rotatably receiving said sleeve portion,

an electromagnetic coil mounted in said frame,

means for restraining said frame from rotation while allowing said frame to move axially on said output hub,

biasing means for urging said frame toward said output hub flange when said coil is deenergized,

an annular pole piece movable axially between a clutch engaged and a clutch disengaged position, said pole piece defining a frictional clutch face, said coil when energized urging said clutch pole piece into said engaged position wherein said clutch face engages said annular clutch armature face, and

said biasing means also urging said pole piece toward said clutch disengaged position and said frame toward a brake engaged position.

4,878,569

CAGE

Georg Schaeffler, Herzogenaurach, Fed. Rep. of Germany, assignor to INA Walzlager Schaeffler KG, Fed. Rep. of Germany

Filed Apr. 4, 1984, Ser. No. 596,547

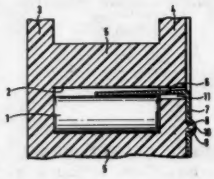
Claims priority, application Fed. Rep. of Germany, Apr. 15, 1983, 3313639

Int. Cl.[4] F16D *3/34*

U.S. Cl. 192—45 **2 Claims**

1. A cage for an overrunning roller clutch comprising pockets for accommodating cam rollers defined by cross bars connected at least at one end by an end ring, each pocket being provided with a separate spring element formed by a leaf spring slightly tangentially inclined relative to the adjacent

cross bar, the said leaf springs being connected at one end with an annular flange abutting against the outside of one end ring



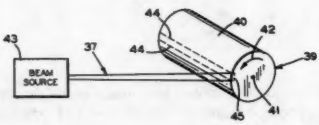
of the cage and each leaf spring passing therethrough by a cutout.

4,878,570

SURFACE HARDENED SPRAGS AND ROLLERS

Thaddeus F. Zlotek, Center Line, Mich., assignor to Dana Corporation, Toledo, Ohio

Filed Jan. 25, 1988, Ser. No. 147,854
Int. Cl.[4] F16D *41/07*
U.S. Cl. 192—45 17 Claims



1. An overrunning clutch comprising:

a first body of generally circular tubular crosssection and having an inwardly facing arcuate first wall defined at a first diameter;

a second body of generally circular cross-section positioned coaxially within said first body and having an outwardly facing arcuate second wall defined at a second diameter less than said first diameter;

a plurality of elongate metallic elements disposed between said first and second walls, said elements each having at least one arcuate surface extending generally parallel to a longitudinal axis of said element and adapted to slidingly contact at least one of said first and second walls; and

each of said metallic elements having a relatively hard surface area formed on at least a portion of said one arcuate surface by implantation of ions of a gaseous element accelerated toward said one arcuate surface, said ions being located throughout a zone extending from an outer surface of said relatively hard surface area inwardly to a predetermined depth.

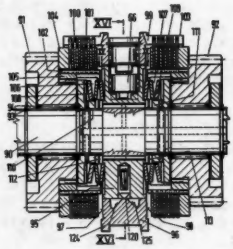
4,878,571

SHIFTABLE FRICTION CLUTCH FOR GEAR DRIVES

Christoph Sacher, Sauerlach/Arget, Fed. Rep. of Germany, assignor to Carl Hurth Maschinen - und Zahnradfabrik GmbH & Co., Munich, Fed. Rep. of Germany

Filed Jul. 9, 1987, Ser. No. 72,148
Claims priority, application Fed. Rep. of Germany, Jul. 9, 1986, 3623142
Int. Cl.[4] F16D *13/42, 21/00*
U.S. Cl. 192—48.91 19 Claims

1. In a shiftable friction clutch having first and second friction members for operably connecting a selected drive gear to a shaft, comprising a gearshift sleeve encircling said shaft and first support means for supporting said gearshift sleeve for axial movement and for a limited rotational movenment relative to said shaft during an engaging operation said first friction member belonging to a first clutch half being axially movable by said gearshift sleeve and which through friction surfaces cooperates with said second friction member belonging to a second clutch half, said first and second friction members, during engagement being pressed onto one another by an engagement force developed against the bias of a spring means, at least one springloaded drop-in pin mounted on said shaft and being guided for movement radially with respect to said shaft having means for initially locking said drop-in pin to said gearshift sleeve ina neutral position and which during the engaging operation engages with and produces an axially directed initial force on an inclined surface on said gearshift sleeve to initiate said engagement of said shiftable friction clutch, the improvement wherein bolt means are mounted in openings provided in said gearshift sleeve and wherein block means are provided and include second support means for mounting said block



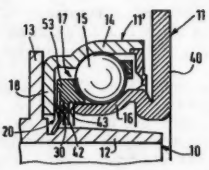
means relative to said shaft, at least one of said bolt means and said block means having a peg means provided thereon and the other of said bolt means and said block means having a recess receiving said peg means therein, the mutually contacting surfaces of said peg means and said recess, which contact one another during a change in condition of said shiftable friciton clutch from a neutral condition to an engaged condition, defining an angular relationship to a plane of rotation, said mutually contacting surfaces at a location corresponding to a position of said bolt means and said block means when said shiftable friction clutch is in the neutral condition defining a larger angle with said plane of rotation than said mutually contacting surfaces at a location corresponding to a position of said bolt means and said block means when said shiftable friction clutch is in the engaged condition.

4,878,572

ROLLER BEARING CAGE FOR CLUTCH RELEASE BEARING

Christian Gay, Paris, and Philippe Lassiaz, Boulogne, both of France, assignors to Valeo, Paris, France

Filed Aug. 19, 1988, Ser. No. 234,323
Claims priority, application France, Aug. 24, 1987, 87 11850
Int. Cl.[4] F16D *23/14, 25/08*
U.S. Cl. 192—98 5 Claims



1. A clutch release bearing suitable for an automobile vehicle, of the kind comprising an operating member and a drive member comprising a roller bearing having a non-rotatable race carrying a radial flange thereon, and a rotatable race

between which are disposed rolling elements restrained by a roller bearing cage, said driving member bearing axially directly or indirectly against the operating member, and an elastic washer within the drive member adapted to clamp the drive member and the operating member axially together, said elastic washer bearing on a bearing surface of the operating member and on the radial flange connected to the non-rotatable race, said drive member comprising a fitting bearing operable to act on the elastic washer during relative approach of the drive member relative to the operating member during assembly, said fitting bearing being carried by the roller bearing cage and being axially disposed between the rotatable race and the radial flange of the non-rotatable race.

4,878,573

A COIN SEPARATOR HAVING A PROJECTING WALL FOR AUGMENTING THE SEPARATION OF COINS OF DIFFERENT DIAMETERS

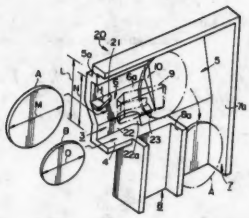
Osamu Kobayashi, Tsurugashima, and Koji Yukimoto, Sakado, both of Japan, assignors to Kabushiki Kaisha Nippon Conlux, Tokyo, Japan

Filed Mar. 18, 1988, Ser. No. 170,967

Claims priority, application Japan, Mar. 26, 1987, 62-44479[U]; Apr. 1, 1987, 62-49766[U]

Int. Cl.[4] G07D *5/02*; G07F *3/04, 1/04*

U.S. Cl. 194—338 **2 Claims**



1. A coin separator comprising:

a first coin passage including an inclined rail on which two coins having larger and smaller diameters are transferred;

a first inclined wall formed sidewise of said inclined rail, an upper end of said first inclined wall being inclined at a predetermined angle toward the outside of said first coin passage, the height of said first inclined wall being generally larger than the diameter of a large diameter coin;

a second inclined wall formed upstream of said first inclined wall, an upper end of said second inclined wall being inclined at a predetermined angle toward the outside of said first coin passage, said predetermined angle of said second inclined wall being greater than that of said first inclined wall, the height of said second inclined wall being generally larger than the diameter of a smaller diameter coin;

a wall projecting from a position located opposite to said second inclined wall to the inside of said first coin passage;

a wall portion connecting the downstream end of said second inclined wall with said first inclined wall so as to change the direction of coins when the coins contact said wall portion;

a second coin passage in communication with the downstream end of said inclined rail; and

a third coin passage provided downward of said projecting wall, an upstream end of said third coin passage in communication with said first coin passage,

whereby coins having larger and smaller diameters transferred within said first coin passage are tilted toward said first inclined wall and said second inclined wall by said projecting wall and the tilted coins are selected according to the diameter thereof in a manner such that a larger diameter coin is guided into said second coin passage along said first inclined wall and a smaller diameter coin is guided into said third coin passage along said second inclined wall and said wall portion,

a projection being provided on the inclined surface of said second inclined wall located opposite to said projecting wall, said projection projects toward the inside of said first coin passage, said projection having a height decreasing in the downstream direction of said second inclined wall, and a starting end of said projection being located at a more upstream side of said first coin passage than a starting end of said projecting wall.

4,878,574

APPARATUS FOR SORTING WORKPIECES

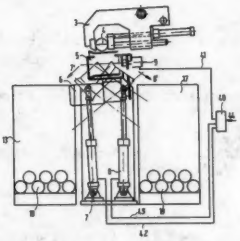
Siegfried Ritter, Reutlingen, Fed. Rep. of Germany, assignor to Gustav Wagner Maschinenfabrik GmbH & Co. KG, Reutlingen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 895,793, Aug. 12, 1986, abandoned. This application Feb. 16, 1988, Ser. No. 156,209

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1985, 3529149

Int. Cl.[4] B65G *47/46*

U.S. Cl. 198—369 **10 Claims**



1. An apparatus for sorting cut lengths discharged from an automatic metal cutting saw, comprising at the discharge side of said saw:

a movable, endless link conveyor belt; drive means for driving said conveyor belt in a moving direction;

a plurality of partitions arranged in spaced relation in the moving direction of said conveyor belt;

mounting means for mounting said partitions for movement in the moving direction of said conveyor belt;

a plurality of receiving bins arranged on opposite sides of said conveyor belt and mounted on said partitions, said receiving bins having different dimensions for receiving cut lengths of different dimensions, said receiving bins being spaced at predetermined lengths from said source;

discharge means for discharging said cut lengths from said conveyor belt into respective ones of said bins; and

trough means secured to a lower portion of each partition for collecting material falling therein.

4,878,575

VIBRATORY FEEDER FOR ELASTOMERIC COMPONENTS

Walter McDonald, Newton, and Norbert J. Seitel, Gillette, both of N.J., assignors to Norwalt Design, Inc., Randolph, N.J.

Filed Dec. 30, 1988, Ser. No. 292,402

Int. Cl.[4] B65G *27/00*

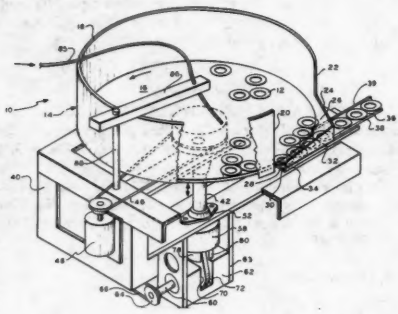
U.S. Cl. 198—391 **9 Claims**

1. Appartus for accepting an initially presented population of random articles formed from soft polymeric material, and providing a high speed output stream, wherein all said articles are commonly oriented for further mechancal manipulation; said apparatus comprising:

an input bowl for accepting said articles, said bowl including a rotatably central disk for feeding said articles rendered incident thereupon to the periphery of said disk;

a continuous wall member rising upwardly from a point adjacent the periphery of said disk and extending about a major arced zone of said disk;

an output section for delivering said articles from said disk,



said output section being defined adjacent the periphery of said disk, at the portion thereof opposed to said major arced zone;

chute means for receiving said articles from said output section;

means for rotating said disk; and

means for vibrating said disk during its rotation in a direction normal to the plane thereof.

4,878,576

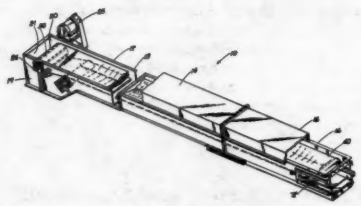
METHOD FOR ACCUMULATING AND CONTAINING BORE HOLE SOLIDS AND RECOVERING DRILL FLUIDS AND WASTE WATER ON DRILLING RIGS

Gary H. Dietzen, 110 Stonewood Cir., Lafayette, La. 70508

Continuation of Ser. No. 99,653, Sep. 28, 1987, abandoned, which is a continuation of Ser. No. 822,009, Jan. 24, 1986, abandoned, which is a continuation-in-part of Ser. No. 783,009, Oct. 1, 1985, abandoned, which is a continuation-in-part of Ser. No. 570,398, Jan. 13, 1984, abandoned. This application Sep. 27, 1988, Ser. No. 250,998

Int. Cl.[4] **B65G** *21/00, 45/00;* **E21B** *21/06*

U.S. Cl. 198—494 **4 Claims**



1. A method of disposing of oil well drilling cuttings that comprise a combination of rock drill bit cuttings, drilling mud, and oil comprising the steps of:

a. providing an elongated, two level structural conveyor including at least two elongated self-supporting, structural fluid containing sections temporarily connectable together to form an enclosure that will contain fluids, one of the sections carrying a motor driven drive roller and the other section containing an idler roller spaced therefrom with an elongated endless conveyor belt being mounted upon and between the two spaced apart rollers;

b. supporting the upper or conveying portion of the belt with an upper level V-shaped conveyor support bed so that the belt slides upon the V-shaped support bed;

c. supporting the return portion of the endless belt with a lower level return bed portion of the structural sections so that the belt slides on the return bed;

d. transporting oil well drill cuttings on the V-shaped support bed with the belt between intake and discharge positions that are spaced apart and respectively adjacent the spaced rollers by frictional drive transmitted to the belt with the drive roller;

e. containing any fluid transmitted by the conveyor belt within the structural conveyor section so that leakage does not occur in the central portion of the conveyor sections generally between the two rollers;

f. discharging the conveyed cuttings from an end portion of the conveyor adjacent one of the spaced apart two rollers; and

g. using transverse channels on the drive roller to channel away fluids from the area of contact between the drive roller and belt.

4,878,577

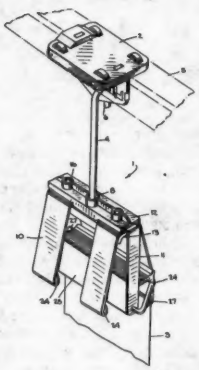
PEG FOR OVERHEAD TROUSER CONVEYOR

Antonio Romero Lledo; Fernando Diaz Zorita, and Juan Cristos, all of Madrid, Spain, assignors to Investronica, S.A., Madrid, Spain

Continuation of Ser. No. 117,629, Nov. 5, 1987, abandoned. This application Nov. 1, 1988, Ser. No. 267,756

Int. Cl.[4] **B65G** *29/00*

U.S. Cl. 198—803.9 **7 Claims**



1. A peg for an overhead conveyor used in a pressing process for conveying a workpiece from one work station to another, said peg comprising:

an elongated rigid base member having a first end and a second end;

an inverted V-shaped plate member mounted at its top to said base member between the first and second end thereof, said mounted inverted V-shaped plate member having a first leg and a second leg extending downwardly from said base member;

a first strip member mounted to the first end of said base member and extending downwardly therefrom;

a second strip member mounted to the second end of said base member and extending downwardly therefrom;

an elongated rectangular prism member disposed within said first and second legs of said V-shaped plate member and extending substantially parallel to said base member, said

rectangular prism member having a first contact surface defined by one surface thereof and a second contact surface defined by an adjacent second surface thereof;

means mounting said elongated prism member to said first and second strip members for selectively tilting said first contact surface adjacent said first leg of said V-shaped plate member and said second contact surface adjacent said second leg of said V-shaped plate member; and

means connected to said base member for mounting said peg to said overhead conveyor.

4,878,578

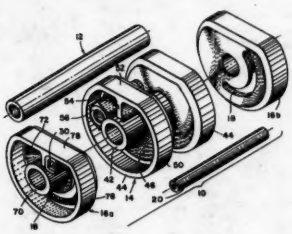
SPLIT-CAM CONVEYOR ROLLERS

Gerald A. Brouwer, Grandville, Mich., assignor to Rapistan Corp., Grand Rapids, Mich.

Filed Jun. 10, 1988, Ser. No. 204,897

Int. Cl.[4] B65G *15/00*

U.S. Cl. 198—809 **7 Claims**



1. A cam roller assembly for supporting a propelling member in both raised and lowered positions, said cam roller comprising:

first and second eccentric rollers mounted coaxially and rotatable relative to one another between a lowered position wherein the portions of least radius of said rollers are in phase with each other and a raised position wherein the portions of least radius of said rollers are out of phase with each other;

stop means for limiting relative movement of said first and second rollers between the lowered and raised positions; and

retaining means for releasably retaining said first and second rollers in the raised position after said rollers are moved to said raised position said retaining means being a magnetic member on one of said first and second rollers and magnetically attracted means on the other of said first and second rollers.

4,878,579

TAMPER-PROOF COIN CASE

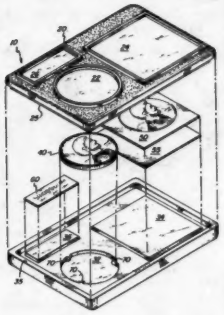
Alan Hager, Stamford, Conn., assignor to Robert M. Paul, Meadowbrook, Pa.

Filed Apr. 24, 1987, Ser. No. 42,174

Int. Cl.[4] A45C *11/28*

U.S. Cl. 206—0.84 **15 Claims**

1. A tamper-proof coin case which is comprised of a unitary assembly comprising a first substantially planar member having a first element of an interlocking means disposed circumferentially thereabout, said first planar member being joined to a second substantially planar member having a second element of said interlocking means whose shape is complementary to said first element and which is disposed circumferentially about said second planar member, said unitary assembly having a first interior retention zone shaped such that a coin can be retained within said first interior retention zone, a second interior retention zone shaped such that at least one photograph of the coin can be retained within said second interior retention zone and a third interior retention zone shaped such that a certificate for the coin can be retained within said third interior retention zone, each of said planar members having a first transparent portion located to permit observation of each side of a coin retained within said first interior retention zone, each of said planar members further comprising a second transparent portion located to permit observation of two photographs of the coin retained within said second interior retention zone and said first planar member further comprising a



third transparent portion located to permit observation of a certificate for the coin retained within said third interior retention zone; wherein the exterior surfaces of said first and second planar members which do not comprise said transparent portions have a surface texture which causes at least partial opacity; and further wherein said unitary assembly is formed by ultrasonically welding said first and second planar members together.

4,878,580

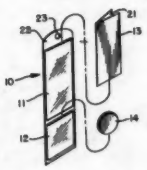
SCENE AND VERSE COORDINATED MEDALLION AND CARD PACKAGED TOGETHER IN A TWO POCKETED TRANSPARENT PROTECTIVE PACKAGE

C. Lamar Johnston, 3641 Stratford, Dallas, Tex. 75205

Filed Aug. 31, 1988, Ser. No. 238,770

Int. Cl.[4] B65D *77/00*

U.S. Cl. 206—216 **6 Claims**



1. A card and coin scene and verse coordinated together as a pair comprising: a card having a scene on a first side and a verse on the second side; a coin having a scene on a first side like te scene on a first side on the card, and a verse on a second side like the verse on the second side on the card, for marketing of the card and coin as a coordinated card and coin pair in the market place; wherein said card is a folded over on itself card for personal signature and note inscription on the inside of the card; said card and coin are packaged together in a protective package; said protective package is a transparent protective plastic package; said transparent protective plastic package includes two pockets a card containing pocket and a coin containing pocket; said card containing pocket is a rectangular pocket; and said conin containing pocket is a square pocket; said card pocket and said coin pocket are positioned in said

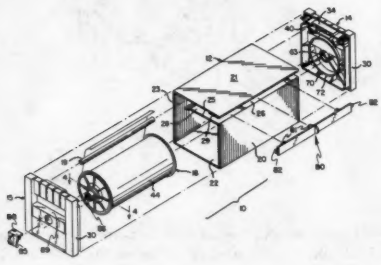
package with the card pocket above the coin pocket in the common plane of said package; said card pocket and said coin pocket are of substantially the same width, and vertically aligned pockets; and wherein said card pocket is larger than said coin pocket.

4,878,581

CARTRIDGE FOR WEB-TYPE MEDIA MATERIAL

Jack Beery, Centerville, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed Oct. 17, 1988, Ser. No. 258,928
Int. Cl.[4] B65D *85/38*
U.S. Cl. 206—416 6 Claims



1. In a spool cartridge for containing a spool of web type light and pressure sensitive media material in which the edges of such material are protected from damage in the event of a sudden axially-applied acceleration such as may occur when such a cartridge is dropped, comprising:

a cartridge housing having a pair of spaced apart end caps,

a spool of such media material in said cartridge between said end caps,

said spool having a core and having end flanges forming generally radial inside surfaces positioned in close proximity to the convoluted edges of such a web of wound media material on said core,

means mounting said spool on said cartridge end caps for rotation in said housing, and

each said end cap having means defining at least one axially extending retainer having an inner abutment edge terminated in close proximity to said spool at an outside surface of an adjacent said end flange for receiving axial loads applied by said spool in the event that said cartridge is dropped on one of said end caps thereof.

4,878,582

MULTI-CHANNEL BICHROMATIC PRODUCT SORTER

Elias H. Codding, Houston, Tex., assignor to Delta Technology Corporation, Houston, Tex.

Filed Mar. 22, 1988, Ser. No. 171,560
Int. Cl.[4] B07C *5/342*
U.S. Cl. 209—580 22 Claims

1. A sorting apparatus for sorting agricultural products into acceptable and unacceptable categories based on a pattern check and a ratio check of color characteristics of the products as they descend in a chute or conduit through a zone of illumination in a viewing station, comprising:

(a) means for sensing the light reflected from successive portion of the product in the zone of illumination at plural sensors about the periphery of the zone of illumination;

(b) means for dividing the sensed light reflected from the portions of the product into plural color illumination level components;

(c) means for converting the color illumination level components into electrical component level signals;

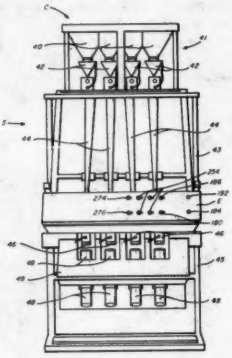
(d) classification means for analyzing the electrical component level signals to determine if the color of individual ones of the product is acceptable, comprising:

(1) ratio check circuit means for comparing the ratio of the electrical component level signals to detect unacceptable product;

(2) pattern check circuit means for comparing each of the electrical component level signals against a reference level to detect unacceptable product;

(3) means for selectively energizing said ratio check circuit means and said pattern check circuit means;

(4) product reject means for forming a signal indicating an unacceptable product as detected by at least one of said



ratio check circuit means and said pattern check circuit means;

(e) control circuit means for selectively enabling said ratio check circuit means and said pattern check circuit means;

(f) background means for providing a background illumination level in the zone of illumination when energized;

(g) means for enabling said background means when said pattern check circuit means is enabled;

(h) means for disabling said background means when said ratio check circuit means is enabled; and

(i) ejector means responsive to said product reject means for removing unacceptable product from the descending products.

4,878,583

STORING AND DISPENSING SYSTEM

Edmund T. Paquette, Shrewsbury, and John W. Beam, Princeton, both of Mass., assignors to Wright Line, Inc., Worcester, Mass.

Filed Dec. 2, 1987, Ser. No. 127,797
Int. Cl.[4] A47G *19/08*
U.S. Cl. 211—41 17 Claims

1. A system for storing and dispensing objects such as magnetic tape cartridges comprising:

a storage cell for receiving an object having:

a bottom,

a rear wall,

a discharge end opposite the rear wall,

a ridge at the discharge end of the cell extending upwardly from the bottom across the cell and engagable with the object residing on the bottom of the cell,

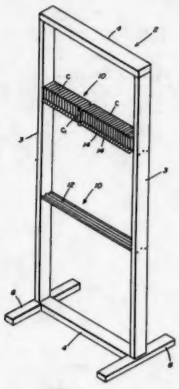
a central, elongate, cantilever area formed in the bottom,

means mounting the cell for pivotal movement relative to the horizontal,

means for restraining the central area from pivotal movement,

whereby when the discharge end of the cell is pivoted

downwardly, the object remains on the central area, the ridge moves below the object and the rear wall urges the



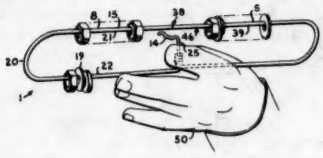
object along the central area outwardly of the cell into a position where it may be grapsed for removal.

4,878,584

ARTICLE HOLDER AND SELECTOR

Elbert J. Young, 1025 N. Prospect, Liberal, Kans. 67901

Filed May 11, 1989, Ser. No. 350,407
Int. Cl.[4] A47F *7/00*
U.S. Cl. 211—59.1 **14 Claims**



1. A device for storing and allowing selection of a particular article from a plurality of articles strung thereon, said device comprising:

(a) primary holding means, having a first elongate member adapted to extend through an aperture in each of the articles being held by said device;

(b) secondary holding means having a second elongate member connected to said primary holding means; said primary and secondary holding means having a storage position, and a selection position relative to one another; and

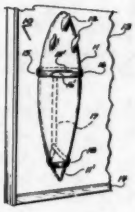
(c) said primary and secondary holding means being alignable when in said selection position such that said first and second elongate members are connected end to end to allow the articles to be moved between said first and second members without removing the articles from the device and said first and second elongate members are separable such that a preselected one of said articles may be removed from said device and thereafter said first and second members are reconnectable; and further said primary and secondary holding means are alignable in the storage position wherein said first and second elongate members are not aligned end to end.

4,878,585

SPORTBOARD WALL-DISPLAY SAFETY-HANGER FIXTURE

Andrew J. Orestano, 8706 Mariposa St., La Mesa, Calif. 92041

Filed Dec. 9, 1987, Ser. No. 130,436
Int. Cl.[4] A47F *7/00*
U.S. Cl. 211—87 **9 Claims**



1. A special T-harness apparatus constructed of flexible strap material for wall or door hanging of various types of 'sportsboards' and similar articles; comprising:

an upper portion of the T-harness having first and second arm members, each outer end portion thereto having an integral mating fastener means facilitating 180-degree wrap-around of both said strap members relative to the body of the thus captive sportboard;

a third and lower T-strap extension member stemming centrally down from the said upper opposed T-strap arm members at a right-angle, and including an integrally formed bottom most inverted-Y nose stirrup arrangement into which the sportboard-nose is inserted so as to become retentively seated therein via force-of-gravity.

an first and second upper hanger means, located approximately at the junction point of all three T-strap members, and capable of engaging upon a wall-hanger device such as a conventional protruding nail, screw, or picture-hanger type device, and thereby providing a basic vertial hanging modality via a single point.

4,878,586

RACK AND TUBE MEMBER FOR ORGANIZING ELECTRICAL CORDS

Darl Bancroft, and Beverly Bancroft, both of 10490 Clark Rd., Eagle, Mich. 48822

Filed Nov. 2, 1988, Ser. No. 266,431
Int. Cl.[4] A47F *5/08*
U.S. Cl. 211—106 **6 Claims**

1. An organizer rack for electrical cords, comprising:

a first elongate post member;

said first post member being mounted to a wall means;

a first plurality of peg members disposed in equidistantly spaced relation to one another along the extent of said first post member;

said first plurality of peg members lying in a common vertical plane orthogonal to a plane of said wall means;

said first plurality of peg members being disposed upwardly at a common predetermined angle relative to a horizontal plane;

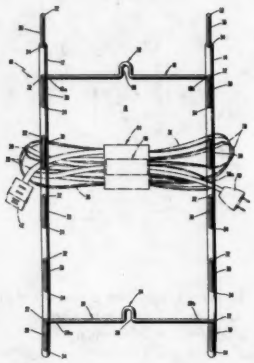
a second elongate post member mounted to said wall means in laterally spaced, parallel relation to said first post member;

a second plurality of peg members disposed in equidistantly spaced relation to one another along the extent of said second post member;

said second plurality of peg members lying in a common vertical plane orthogonal to a plane of said wall means;

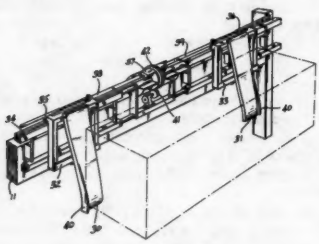
said second plurality of peg members being disposed upwardly at a common predetermined angle relative to a horizontal plane;

said first and second post members being vertically disposed;
means for securing said first and second post members to said wall means;
a plurality of truncate tubular members; and
said plurality of tubular members being equal to one-half the number of said peg members;



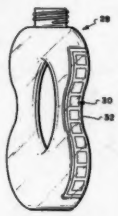
whereby a plurality of electrical cord means that have been folded at equidistant intervals along their respective extents are slidably inserted into a hollow interior of an associated tubular member; and
whereby opposite ends of electrical cords that have been folded at substantially equidistant intervals along their extent are releasably engageable to said peg members.

4,878,587
POSITIONING APPLIANCE
Gerhardus J. Wormmeester, Zwijndrecht, Netherlands, assignor to Europe Container Terminus B.V., Rotterdam, Netherlands
Filed Apr. 14, 1988, Ser. No. 181,821
Claims priority, application Netherlands, Apr. 15, 1987, 8700893
Int. Cl.[4] B66C *13/08*
U.S. Cl. 212—271 **3 Claims**



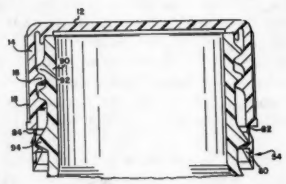
1. A positioning appliance for positioning a container suspended on crane cables, comprising: two carriages; two slide chutes having top ends each of which is pivotably suspended at their top ends on one of said carriages; actuating means for pivoting the slide chutes; actuating means for moving the carriages; a spacer movable in the direction of movement of the carriages disposed between the carriages; a stopping device associated with each carriage operative to be brought into engagement with said spacer by moving the respective carriage; and means to coordinate the actuating means for moving the carriages, when there is contact between the two stopping devices and the spacer, so that the carriages, the stopping device and the spacer move as one unit.

4,878,588
BABY NURSING BOTTLE WITH TEMPERATURE INDICATOR
Jacob Ephraim, 24419 Plumtree Ct., West Hills, Calif. 91307
Filed Jun. 7, 1988, Ser. No. 203,693
Int. Cl.[4] A61J *9/02*
U.S. Cl. 215—11.2 **7 Claims**



1. A baby feeding bottle, comprising:
an elongated, hollow vessel constituted by an integral side wall and an end wall and being open at the other end, said side wall having a smooth, curved section thereon with a varying gradient, said smooth curved section including an elongated, smooth, inwardly recessed portion with a similarly varying gradient thereon and a clear cover ultrasonically bonded to the periphery of said recessed portion, said clear cover having a similarly varying gradient for covering said recessed portion in a flush manner with respect to said side wall, an elongated closed space being formed between said recessed portion and said cover; and
a liquid crystal-type strip thermometer disposed within said elongated space, said strip thermometer having temperature indications in a selected temperature range around 37° C.

4,878,589
LINERLESS CAP CLOSURE
Charles Webster, Oak Lawn, and Christian J. John, Downers Grove, both of Ill., assignors to American National Can Company, Chicago, Ill.
Continuation-in-part of Ser. No. 43,106, Apr. 27, 1987, Pat. No. 4,741,447. This application Apr. 26, 1988, Ser. No. 186,460
Int. Cl.[4] B65D *41/34, 53/00*
U.S. Cl. 215—252 **6 Claims**



1. A linerless cap closure comprising a generally circular top wall with a depending annular skirt having an internal thread adapted to engage with an external thread on a container neck and sealing means depending from a lower surface of said top wall adjacent said annular skirt, said sealing means including an annular protrusion integral with said lower surface and being generally rectangular in cross-section and having an outer wall, an inner wall and a bottom wall, and an annular projection integral with said bottom wall of said protrusion, said

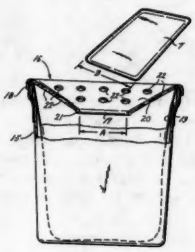
projection having a flat outer wall and an arcuate inner wall merging with said flat outer wall through a reduced radiused portion, said inner wall of said projection merging with said bottom wall of said protrusion intermediate opposite ends thereof and having a flat wall portion extending perpendicular to said bottom wall so that upon threading of said closure onto a threaded container neck the projection will engage and slide along an outer edge of the container neck and provide a side seal with said flat wall portion and said bottom wall of said protrusion will engage on a top surface of said container neck to produce an additional seal.

4,878,590

RECEPTACLE COVER FOR PREVENTION LOSS OF TRAYS WITH TRASH

James L. Porter, Thayer, Mo. 65791

Filed Dec. 5, 1988, Ser. No. 279,923
Int. Cl.[4] B65D *25/02*
U.S. Cl. 220—1 T **4 Claims**



1. The combination with an open top refuse container to receive refuse dumped into the container, of a refuse carrying tray for transporting refuse to the container, and an external container cover comprising a body supported by and removably fitted with a downwardly sloped surface presented to receive refuse from said tray and direct it into the open top refuse container, said sloped surface being sized to cover the open top of the refuse container and being formed with a principal opening therethrough for directing refuse into the container placed on said sloped surface, and said principal opening having a fixed size in its largest dimension to be less than the least dimension of said refuse carrying tray, whereby the fixed size of said principal opening in said sloped surface will pass refuse into the container and arrest efforts to force the passage of said refuse carrying tray into the container.

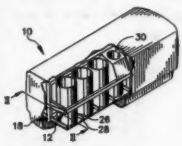
4. The combination with an open top refuse receiving container in which refuse is dumped from a refuse carrying tray, of a container cover molded from plaster and having a rim for removably seating on the container open top, said cover having a circular funnel shaped surface integrally formed on and projecting from said rim downwardly into the container, and said funnel shaped surface having a bottom opening for passing refuse into the container and a plurality of secondary openings distributed through said shaped surface for the passage of fluid in the refuse while solids in the trash pass through said bottom opening, and said bottom opening having a bead defining the margin thereof to be less than the smallest dimension of the refuse carrying tray, whereby the bead strengthens said opening and arrests efforts to force the passage of the carrying tray into the container while allowing refuse to pass into the container.

4,878,591

SHOCK RESISTANT CELLULAR FUEL TANK

Daniel D. Johnston, 355 "T" Ave., Coronado, Calif. 92118

Filed Jul. 5, 1988, Ser. No. 215,040
Int. Cl.[4] B65D *1/24*
U.S. Cl. 220—22 **18 Claims**



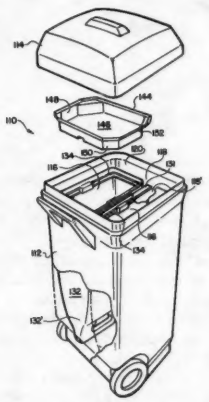
1. A shock resistant cellular fuel tank comprising:
a peripheral frame having longitudinally extending top, bottom and opposed side members;
an array of vertically oriented tubular cells mounted to and within said peripheral frame; and
an impervious shell preloaded and stressed in tension over said frame for restraining movement of said frame within said shell and enclosing said cells.

4,878,592

APPARATUS FOR SEGREGATED REFUSE COLLECTION

Norman C. Lee, Greensboro, N.C., assignor to Zarn, Inc., Reidsville, N.C.

Filed Jun. 28, 1988, Ser. No. 212,609
Int. Cl.[4] B65D *91/00*
U.S. Cl. 220—23.83 **21 Claims**



1. Apparatus for segregated collection of differing types of refuse and the like such as recyclable trash materials, comprising:
a container body defining an interior receptacle receiving area and an access opening thereinto; and
a plurality of receptacle units each defining an interior storage area, a receptacle opening thereinto, and a closed end generally opposite said receptacle opening, said receptacle units being of complimentary shapes and sizes for individually removable disposition in side-by-side relation within said receiving area of said container body with said receptacle openings of said receptacle units generally adjacent one another and said access opening of said container body;

each said receptacle unit having first gripping means adjacent said receptacle opening at second gripping means at said opposite closed end for manual insertion and removal of said receptacle unit into and from said container body and for easy inversion of said receptacle unit for discharging its contents, said second gripping means being configured to render said recepticle unit incapable of free standing disposition on said opposite closed end to minimize possible theft or loss thereof.

4,878,593

PACK FOR FLOWABLE MATERIAL

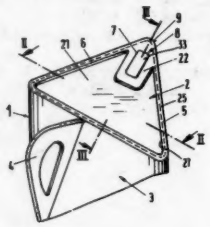
Hans Rausing, Wadhurst Park, Wadhurst, East Sussex TN5 6NT, Great Britain

Filed Jul. 27, 1987, Ser. No. 78,221

Claims priority, application United Kingdom, Jul. 28, 1986, 8618390

Int. Cl.[4] B65D *25/00*

U.S. Cl. 220—67 **7 Claims**



1. A pack for flowable material, the pack including:

(a) a tube made of a base material coated on at least one side with a thermoplastic material and having at least one longitudinal seam and a top end and a bottom end, the top end of the tube having an edge;

(b) a bottom fitted to the tube at the bottom end; and

(c) a lid formed from a thermoplastic material and welded to the tube at the top end, the lid having a generally downwardly extending exterior flange, the lid having an annular peripheral wall, and a pouring device adjacent the peripheral wall, the flange extending downwardly from the exterior of the peripheral wall of the lid, the lid having a first interior wall extending generally downwardly from a portion of the interior of the peripheral wall, the lid having a second interior wall extending generally horizontally from the first interior wall, the downwardly extending flange, the peripheral wall, and the first interior wall forming a U-shaped groove for receiving the edge of the top end of the tube, the pouring device having an upper wall extending generally horizontally from a portion of the peripheral wall, the lid having a third interior wall extending generally downwardly from the upper wall of the pouring device to the second interior wall, the third interior wall being adapted to being grasped during welding the lid to the tube to permit the application of pressure to the portion of the flange adjacent the portion of the peripheral wall adjacent the pouring device to provide a good seal.

4,878,594

CLOSING DEVICE FOR CRYOGENIC CONTAINER

Daniel Delatte, Saint Maur, and Bernard Simon, Le Plessis Trevise, both of France, assignors to L'air Liquide, Societe Anonyme pour l'etude et l'exploitation des Procedes Georges Claude, Paris, France

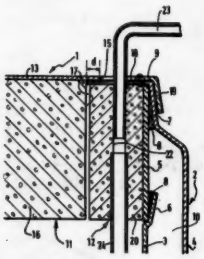
PCT No. PCT/FR88/00208, § 371 Date Nov. 21, 1988, § 102(e) Date Nov. 21, 1988, PCT Pub. No. WO88/08501, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 28, 1988, Ser. No. 286,952

Claims priority, application France, Apr. 30, 1987, 87 06159

Int. Cl.[4] B65D *51/16*; F17C *13/06*

U.S. Cl. 220—254 **5 Claims**



1. Closing device (1) for a cryogenic container (2), characterized in that it comprises a principal stopper (11) having a lateral notch (17) and an auxiliary stopper (12) having a general shape conjugate with that of this notch, the auxiliary stopper being provided with at least one boe (22) and means (19) for fixing said auxiliary stopper to the edge of the opening of the container.

4,878,595

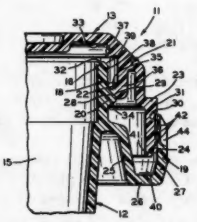
TAMPER RESISTANT WIDE MOUTH PACKAGE WITH LABYRINTH SEAL

Albert R. Uhlig, Toledo, Ohio, assignor to Plastic Technologies, Inc., Toledo, Ohio

Filed Jun. 9, 1988, Ser. No. 204,574

Int. Cl.[4] B65D *41/18*

U.S. Cl. 220—306 **15 Claims**



1. A tamper resistant package comprising:

a container having a side wall defining an open end, a closed end wall attached to said side wall, said side wall having an inner wall and a spaced outer wall at said open end;

a closure formed of a flexible material and having a depending annular skirt adapted to securely fit between said inner wall and said outer wall of said container;

cooperating means formed on an outer surface of said inner wall and an inner surface of said closure for retaining said closure on said container; and

a labyrinth seal defined by the abutment of an annular seal-

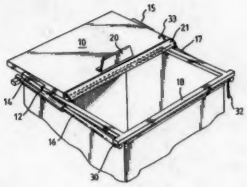
ing surface formed on one of said outer wall and said outer surface of said skirt and at least two outwardly extending annular ridges formed on the other one of said outer wall and said outer surface of said skirt.

4,878,596

WASTE BIN LID

Scott A. Cawley, and Malcolm E. Vidler, both of Brisbane, Australia, assignors to Thiess Contractors Pty. Ltd., Queensland, Australia

Filed Jan. 6, 1989, Ser. No. 293,963
Claims priority, application Australia, Aug. 31, 1988, PJ0154
Int. Cl.[4] B65D *43/20*
U.S. Cl. 220—331 **16 Claims**



9. The combination of a waste bin and a bin closure means, said bin closure means comprising a bin closure means comprising a frame adapted for hinged connection to the opening of a bin such that it forms a seal around the perimeter of the opening and such that it may hinge away from the opening when the bin is inverted during emptying, said frame including a fixed lid and a movable lid, the said movable lid being displaceable along support guides located on two opposite marginal sections of the frame, said support guides being inclined with respect to the plane defining the bin opening so that the movable lid may be displaced between a position overlying and spaced from said fixed lid, and a position where sections of opposed faces of the lids overlap and form a seal therebetween and where the remaining perimter of the movable lid forms a seal with the frame, thereby closing the bin, said waste bin being of hexahedral configuration with a rectangular opening and associated lifting fork pockets on exterior opposing sides to enable the bin to be lifted and inverted for emptying purposes.

4,878,597

LYOPHILIZATION CONTAINERS

William E. Haast, Miami Serpentarium Laboratories, Innovation Center University of Utah, Research Park, 419 Wakara Way, Salt Lake City, Utah 84108

Filed Mar. 24, 1988, Ser. No. 172,556
Int. Cl.[4] B65D *20/00*
U.S. Cl. 220—404 **32 Claims**

25. Apparatus for forming a lyophilizable material into a shell-like conformation wherein the material can be frozen in said conformation and wherein the surface area of the material frozen within the apparatus is increased without damage to the apparatus which could be occasioned by expansion of the lyophilizable material on freezing thereof, comprising:

container means for receiving a lyophilizable material; and,

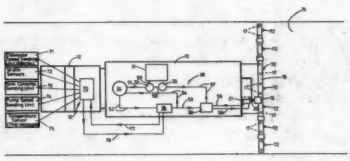
deformable core means insertable into the container means for displacing the lyophilizable material into that space between opposed surfaces of the container means and core means, the core means being formed of a compressible material which is continuous throughout said core means, the core means being deformable on freezing of the lyophilizable material to form a frozen shell of lyophilizable material.

4,878,598

METHOD AND APPARATUS FOR DISPENSING A SUBSTANCE TO A WORK AREA

Dolph W. Ruschhaupt, Jr., Fresno, Calif., assignor to California Fresno Transportation, Inc., Fresno, Calif.

Filed Apr. 30, 1987, Ser. No. 44,302
Int. Cl.[4] G01F *11/00*
U.S. Cl. 222—1 **5 Claims**



1. A method for dispensing a substance to a work area comprising the steps of:

A. determining the quantity of the substance to be dispensed to said work area;

B. dispensing said substance to the work area during movement thereof; and

C. at intervals during said movement thereof:

1. calculating during said movement the quantity of said substance remaining to be dispensed,
2. calculating the portion of said area remaining to have substance dispensed thereto at said intervals, and
3. adjusting the rate of said dispensing at said intervals to correspond to the quantity of the substance remaining to be dispensed by comparing at said intervals the quantity of said substance remaining to be dispensed calculated in the first of said calculating steps with the portion of said area remaining to have said substance dispensed thereto calculated in the second of said calculating steps and adjusting the rate of said dispensing so that said quantity remaining of said substance will be substantially evenly dispensed over said work area.

4,878,599

CAULKING NOZZLE

John M. Greenway, 44 Spruce Dr., Westwood, Mass. 02090

Filed Sep. 3, 1987, Ser. No. 92,464
Int. Cl.[4] B65D *25/42*
U.S. Cl. 222—1 **11 Claims**

1. A tube assembly comprising a tube comprising hardenable material to be extruded through a nozzle in a direction from said tube to an outlet at the end of said nozzle opposite said tube, said material being hardenable upon exposure to air and material at the tip of said nozzle forming a hardened plug of a known length when exposed to air, comprising a nozzle comprising:

a series of hollow members, said members having a first and second end wherein said first end has a first inner cross-sectional dimension and said second end has a second

inner cross-sectional dimension, wherein said second dimension is at least as great as said first dimension, said first dimension being different for each said member, wherein the member having the largest said first dimension is at one end of said nozzle and the member having the smallest said dimension is at the other end of said nozzle, other said members beings positioned between said largest and said smallest dimensioned members in order of decreasing said

dimensions in said direction, whereby said series forms a hollow vessel having a stepwise decreasing inner cross-sectional first dimension,

wherein said largest dimensioned member comprises an opening at one end suitable for connection to said tube, and wherein said members are of a length greater than the length of said plug and wherein said material hardens upon exposure to air only to a depth less than the depth of a said member.

4,878,600

STATIC CONTROLLED DISCHARGE SPOUT

Norwin C. Derby, Dallas, Tex., assignor to Super Sack Manufacturing Corporation, Dallas, Tex.

Continuation of Ser. No. 2,493, Jan. 12, 1987, abandoned. This application Jul. 13, 1988, Ser. No. 220,432

Int. Cl.[4] B65D *33/38*

U.S. Cl. 222—105 **2 Claims**

1. A collapsible product receptacle comprising:

a tubular side wall;

a bottom wall secured to the side wall around the lower end thereof for closing the lower end of the receptacle to retain the product;

a generally pliable cylindrical discharge spout located in the bottom wall for dispensing the product, the discharge spout comprising a continuous inner layer for contact with the product to be dispensed and a continuous outer layer having a continuous inner non-metalized surface securely bonded substantially throughout to the continuous inner layer and a continuous outer surface metalized to a level that is electrically conductive to the static electricity generated by contact of the dispensed product with the inner layer, said inner layer and said inner surface of said outer layer protecting said conductive metalized surface of said spout from wear and tear induced by direct contact with the dispensed product; and

means for connecting the outer conductive surface of the discharge spout to a source of predetermined electrical potential to control the buildup of static electricity in the receptacle.

4,878,601

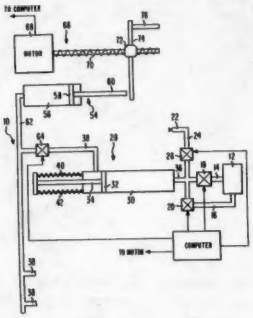
LIQUID DISPENSER

J. Peter Flemming, R.D. #2, 6 Cleveland Road West, Princeton, N.J. 08540, and Robert J. Dee, 338 S. 3rd St., Philadelphia, Pa. 19106

Continuation-in-part of Ser. No. 156,439, Feb. 16, 1988, abandoned. This application Feb. 17, 1988, Ser. No. 156,729

Int. Cl.[4] B65D *85/44*

U.S. Cl. 222—137 **9 Claims**



1. A liquid dispenser comprising:

a plurality of reservoirs for containing different liquids to be dispensed;

a plurality of nozzles for dispensing the liquids from the reservoirs;

a plurality of dispensing cylinders each having a liquid inlet/outlet connected to a separate reservoir and a separate nozzle, and a hydraulic fluid inlet/outlet;

a piston in each of said dispensing cylinders separating the liquid inlet/outlet from the hydraulic fluid inlet/outlet;

hydraulic operating means connected to the hydraulic fluid inlet/outlet of each of the dispensing cylinders for selectively operating the dispensing cylinders, said hydraulic operating means including a cylinder having a hydraulic fluid inlet/outlet at one end, a piston in said cylinder, and a piston rod connected to said piston and extending from the other end of the cylinder, the inlet/outlet of the operating cylinder being connected to the hydraulic fluid inlet/outlet of each of the dispensing cylinders; and

means for operating the hydraulic operating means.

4,878,602

FOOT-ACTUATED POWDER DISPENSER

Peter Weigelt, 5974 Buckingham Pky., #401, Culver City, Calif. 90230

Filed Nov. 10, 1988, Ser. No. 269,485

Int. Cl.[4] A61M *35/00*

U.S. Cl. 222—161 **16 Claims**

1. A foot-actuated powder dispenser comprising:

a pair of vertical support members each having an elongated opening formed therein,

a generally cylindrical dispenser member having a plurality of openings formed in the bottom surface thereof,

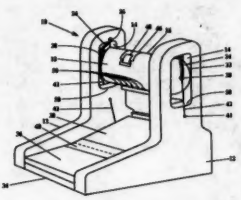
resilient means normally suspending said dispenser member from said support members approximately mideway of said elongated openings,

a treadle member hingedly secured to the lower portions of said support members,

actuator means coupling said treadle member to move said

dispenser member downwardly against the action of said resilient means, and

stop means positioned in the path of movement of said dispenser member to abruptly halt downward movement of said dispenser member and to cause powder contained in said dispenser to be dislodged through said openings for application to the foot on said treadle member.



4,878,603

TONER REPLENISHING DEVICE

Masumi Ikesue, Tokyo, and Takashi Ikeda, Sagamihara, both of Japan, assignors to Ricoh Company, Limited, Tokyo, Japan

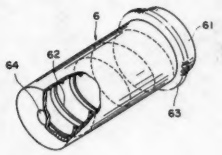
Continuation of Ser. No. 866,414, May 23, 1986, Pat. No. 4,744,493, which is a continuation of Ser. No. 598,022, Apr. 9, 1984, Pat. No. 4,611,730. This application Apr. 8, 1988, Ser. No. 179,626

Claims priority, application Japan, Jan. 9, 1984, 59-1729

The portion of the term of this patent subsequent to May 3, 2005, has been disclaimed.

Int. Cl.[4] B67D *5/64, 3/00*

U.S. Cl. 222—167 **14 Claims**



1. A cartridge for use with a toner replenishing device and for detachable, sealingly and rotationally engaging within a cylindrical portion of a cap-shaped receptacle of the toner replenishing device for the feeding of toner from said cartridge into the toner replenishing device, comprising:

a main body containing a quantity of toner, said main body comprising a substantially hollow container having a longitudinal axis and first and second oppositely-disposed ends, said first end being closed, said second end comprising a mouth portion, said mouth portion comprising a substantially annular sidewall terminating in a plane substantially perpendicular to said longitudinal axis, said mouth portion having a configuration suitable for rotational and sealing engagement within and relative to the cap-shaped receptacle of the toner replenishing device, said main body being open at said plane for the egress of toner; and

a gear disposed on and extending circumferentially of said main body for rotatably driving said cartridge.

4,878,604

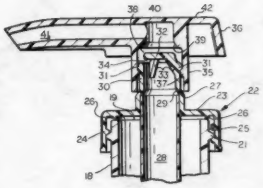
DISPENSING CLOSURE

Jacques J. Barriac, Montgomery, Pa., assignor to Owens-Illinois Closure Inc., Toledo, Ohio

Filed Aug. 31, 1988, Ser. No. 238,657

Int. Cl.[4] B65D *37/00*

U.S. Cl. 222—209 **16 Claims**



1. A liquid dispensing closure assembly for a threaded container neck comprising:

an internally threaded annular skirt adapted to interengage the threaded container neck and secure the closure on the container;

a top wall integral with said skirt and including an axial stepped delivery tube, said stepped delivery tube having a lower large diameter segment and an upper smaller diameter segment, the two segments being joined at an annular shoulder,;

a dip tube;

means connecting the dip tube to said delivery tube;

a stationary circular valve member supported by webs integral with the delivery tube, said circular valve member being disposed at the upper end of the delivery tube and spaced from said delivery tube to permit liquid flow past said valve member;

a delivery spout including a hollow tubular portion telescopically engaging the upper end of said delivery tube;

interengaging snap fit means on the interior of said hollow tubular portion of the delivery spout and the exterior of said delivery tube permitting rotary swiveling movement and axial reciprocating movement of the delivery spout toward and away from the valve member thereon;

said snap fit means comprising an annular bead on the interior of the axial tubular portion of the delivery spout intermediate its length and an annular bead on the exterior of the delivery tube near its upper end, said shoulder segment of the stepped delivery tube limiting axial downward travel of the delivery spout on the delivery tube and defining its axial lower position thereon, and said interior bead of the delivery spout limiting axial upward travel thereof and defining its upper limited position thereon;

an axial outlet passage in said tubular portion of said spout including a seat to receive said valve member and seal said outlet passage from the dip tube when the tubular portion of the spout is moved toward the top wall to the axial lower position and connect said passage with the dip tube when said tubular portion is moved away from said axial lower position toward said upper limited position.

4,878,605

LOAD CARRYING APPARATUS

James P. Doyle, P.O. Box 408, Wis Dells, Wis. 53965, and Lyle J. Rudolph, 1132 Old Roum Rd., Cambridge, Wis. 52523

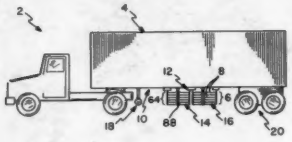
Filed Nov. 17, 1987, Ser. No. 121,529

Int. Cl.[4] B60R *9/00*

U.S. Cl. 224—42.41 **2 Claims**

1. Apparatus for carrying a load of pallets on the underside of a semi-trailer, said apparatus comprising: a series of brackets disposed on the underside of said semi-trailer in spaced-apart relation; means for rigidly securing said brackets to said semi-

trailer; a first flexible strap having a first end and a second end said first flexible strap having rings reinforcingly attached to said first and second end of said first flexible strap; means for releasably securing said first end of said first strap and said second end of said first strap to a pair of said brackets, said means for releasably securing having a first downwardly directed hook coupled to a first bracket and a second downwardly directed hook coupled to a second bracket positioned a mounting-effective distance from said first bracket, said first flexible strap operable for supporting a load of pallets on the underside of said semi-trailer; a second flexible strap, said second flexible strap disposed in a direction generally perpendicular to said first strap to stabilize said load of pallets on the underside of said semi-trailer.



4,878,606

HARNESS FOR SHOULDER SUPPORTED BAG

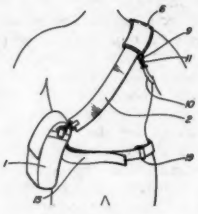
Murray G. W. Miller, Thunder Bay, Canada, assignor to Murlyn Enterprises Ltd., Orillia, Canada

Continuation-in-part of Ser. No. 258,816, Apr. 29, 1981. This application Nov. 17, 1983, Ser. No. 552,944

Claims priority, application Canada, Jan. 9, 1981, 368,202

Int. Cl.[4] A45F *3/14*

U.S. Cl. 224—208 **8 Claims**



1. A waist bag and supporting harness adapted to be worn by a user, comprising an adjustable shoulder strap and pelvic belt cooperating with the bag wherein the waist bag has one face which is oriented towards the waist of the user, which said one face has an associated pelvic belt retention means comprising a plurality of loops arranged in a vertical column, each of which is adapted to receive a horizontally pelvic belt, wherein the pelvic belt may be positioned through a selected one of said loops to support and restrain movement of the bag.

4,878,607

APPARATUS FOR UNREELING A CABLE

Michel Lessard, Lac St Jean, Canada, assignor to Less Micanik Inc., Quebec, Canada

Filed Oct. 31, 1988, Ser. No. 264,972

Int. Cl.[4] B66D *1/48*; B60P *3/00*

U.S. Cl. 226—24 **8 Claims**

1. Apparatus for unreeling a cable, comprising:

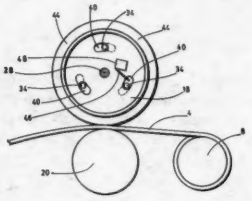
a body provided with positioning means for moving said body with respect to a solid frame;

a drawing means for unreeling said cable, including:

a motor provided with a shaft;

a disk having its centre rigidly locked to said shaft, said disk having a lateral surface provided with at least one pin perpendicular to said surface; and

a wheel having its centre positioned around said shaft by means of a ball bearing, said wheel having one of its lateral sides adjacent to said lateral surface of said disk , said one lateral side of the wheel being provided with at least one slot extending circumferentially for receiving said at least one pin in such a manner that phase displacement is allowed between said disk and said wheel, resilient means being provided for keeping said at least one pin against the forward extremity of said at least one slot, said wheel having its circumference covered by a resilient frictionsurface adapted to squeeze said cable against a rotative guiding roller which allows unreeling of said cable by rotative movement of said wheel, said wheel being applied against said rotative guiding roller to squeeze said cable by means of said positioning means; and



detecting and controlling means for detecting said phase displacement and, upon detection of said phase displacement, activating said motor when said cable is in a rest position or disabling said motor when said cable is unreeling.

4,878,608

HAND STAPLER FOR USE WITH A BAR OF ORNAMENTED STAPLES

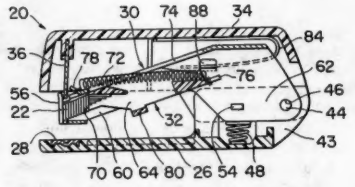
Yoshio Mitsuhashi, Yokohama, Japan, assignor to M.G.S. Japan Co., Ltd., Tokyo, Japan

Filed Dec. 6, 1988, Ser. No. 280,563

Claims priority, application Japan, Jul. 13, 1988, 63-172775

Int. Cl.[4] B25C *5/02, 5/06*

U.S. Cl. 227—120 **10 Claims**



1. In combination with a staple bar having a plurality of ornamented staples separably joined together, each ornamented staple having a bridge interconnecting a pair of parallel legs, and an ornament joined to the bridge, the staple bar being such that the ornaments of the staples are in overlapping relation to one another so that the bridges of the joined staples form an obtuse angle with respect to each pair of staple legs, a hand stapler comprising:

(a) an elongate base having a front and a rear end, with an anvil disposed adjacent the front end of the base;

(b) an elongate staple magazine to be loaded with the staple bar, the staple magazine having a rear end pivotally coupled to the rear end of the base and having a front end movable into and out of engagement with the anvil on the base, the staple magazine comprising a front end wall to be abutted upon by the loaded staple bar and an elongate guide wall for relative sliding contact with the bridges of the loaded staple bar, there being approximately the same obtuse angle between the front end wall and guide wall of the staple magazine as between the bridges of the staple bar and each pair of staple legs;

(c) staple pusher means mounted to the staple magazine for pushing the loaded staple bar against the front wall of the staple magazine;

(d) a handle pivotally coupled to the base and the staple magazine and having a staple ejector for driving the successive staples out of the front end of the staple magazine against the anvil on the base.

4,878,609

APPARATUS FOR MANUAL WIRE BONDING

Farhad Farassat, Munich, Fed. Rep. of Germany, assignor to Emhart Industries Inc., Farmington, Conn.

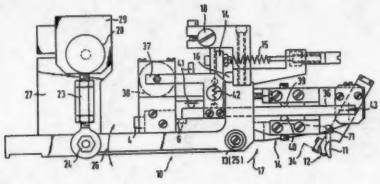
PCT No. PCT/EP87/00258, § 371 Date Feb. 18, 1988, § 102(e) Date Feb. 18, 1988, PCT Pub. No. WO87/06864, PCT Pub. Date Nov. 19, 1987

PCT Filed May 15, 1987, Ser. No. 150,668

Claims priority, application Fed. Rep. of Germany, May 16, 1986, 3616651

Int. Cl.[4] B23K *37/00*

U.S. Cl. 228—4.5 **9 Claims**



1. An apparatus for manual wire bonding, comprising an ultrasonically energizable and/or thermocompression wedge (11) for pressing the wire (34) against a bonding pad, wherein the wedge (11) is part of a bonding head (10) adapted to be moved towards and away from the bonding pad, especially in up/down direction, and the bonding pad is disposed on a base which is movable in a direction approximately transversely to the direction of movement of the bonding head for positioning the bonding pad opposite the wedge (11), and comprising control unit means for controlling a drive unit (20) for the bonding head (10), characterized in that the bonding head (10) is adapted to be moved by the drive unit, said drive unit including a d.c. servomotor (20), in accordance with the following cycle:

(a) lowering of the bonding head (10) from an elevated starting position (54) to a first search position (55);

(b) after positioning of a first bonding pad opposite the wedge (11), further lowering of the bonding head (10) onto the same while compressing the bonding wire (34) thereagainst;

(c) lifting of the bonding head (10) from the first bonding pad while moving the head to a predetermined loop position (65);

(d) lowering of the bonding head (10) to a second search position (66);

(e) after positioning of a second bonding pad opposite the wedge (11), further lowering of the bonding head (10) onto the same while compressing the bonding wire (34) thereagainst;

(f) lifting of the bonding head (10) to the starting position (54) after previously severing the bonded wire length,

wherein said control unit means includes a distance control unit (44–47), a speed control unit (48–51), and a distance and speed feedback unit (28) so that each part-motion and non-motion of the bonding head (10) can be adjusted individually in respect of travelling distance and speed and motionless period, respectively, and can be checked for execution,

said control unit means further includes:

(a) a manually actuated switch (start button 53) for initiating the bonding head motion,

(b) distance potentiometers (44, 45, 46, 47) for setting the starting position or height (54), the first search position or height (55), the second search position or height (66), and the loop position or height (65),

(c) speed potentiometers (48, 49, 50, 51) for setting the speed of the bonding head (10) from the starting position (54) to the first search position (55), from the first search position (55) to the first "touch-down" position, from the first "touch-down" position to the loop position (65), from the loop position (65) to the second search position (66), from the second search position (66) to the second "touch-down" position, and from the second "touch-down" position back to the starting position (54),

wherein the speed potentiometers (48, 49, 50, 51) are coupled to the drive unit (20) via a speed selecting means (31), and wherein,

the distance feedback unit comprises a feedback potentiometer, which is preferably mechanically coupled to the output (output shaft 21) of the drive unit (20), the output of said potentiometer being coupled to a distance comparing unit (30) in which the desired values set by the distance potentiometers (44, 45, 46, 47) are compared with the actualmotion values detected by the feedback potentiometer (28) to produce an error signal (NO) or a correct signal (YES), and wherein,

the speed selecting means (31) associated with the speed potentiometers (48, 49, 50, 51) is coupled on the one hand to the feedback potentiometer and on the other hand to a tachogenerator (32) serving as a speed feedback unit (32), wherein the feedback potentiometer defines the speed change-over points and the tachogenerator (32) detects the actual speed of the bonding head motion so that upon a deviation from a preset desired speed a correction or interruption of the bonding operation will be possible.

4,878,610

DIE BONDING APPARATUS

Ryuichiro Mori; Syuichi Osaka, and Toshinobu Banjo, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Feb. 8, 1989, Ser. No. 307,512

Claims priority, application Japan, Aug. 12, 1988, 63-199994

Int. Cl.[4] B23K *37/04*

U.S. Cl. 228—6.2 **9 Claims**

1. A die bonding apparatus comprising:

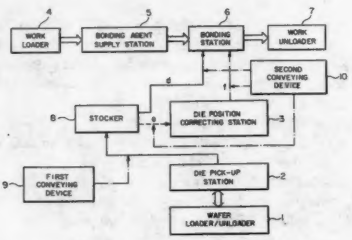
a stocker for temporarily accommodating dice;

a first conveying means for successively picking up a plurality of dice from one wafer and conveying them to said stocker;

a wafer loader/unloader for replacing the wafer from which the dice have been picked up with a new one;

a bonding station for bonding a die to a work which serves as a die mounting medium;

a work loader for supplying works to said bonding station; and



a second conveying means for successively conveying said dice accommodated in said stocker to said bonding station.

4,878,611

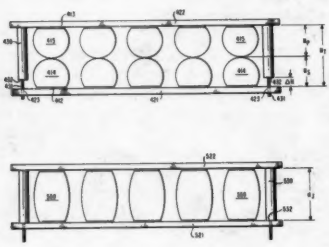
PROCESS FOR CONTROLLING SOLDER JOINT GEOMETRY WHEN SURFACE MOUNTING A LEADLESS INTEGRATED CIRCUIT PACKAGE ON A SUBSTRATE

Francis LoVasco, Roxbury Township, and Michael A. Oien, Chatham Township, both of Morris County, N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 868,988, May 30, 1986, abandoned. This application Jun. 9, 1988, Ser. No. 207,003

Int. Cl.[4] B23K *31/02*

U.S. Cl. 228—180.2 **9 Claims**



9. A method of forming solder joints for joining a package and substrate, comprising the steps of:

depositing substantial, predetermined and controlled volumes of solder on individual pads of a package, each of these pads having a predetermined and controlled size and shape,

depositing substantial, predetermined and controlled volumes of solder on individual pads of a substrate, each of these pads having a predetermined and controlled size and shape,

laterally positioning the substrate and package adjacent to each other with individual pads of the package in registration with associated individual pads of the substrate by shaping associated volumes of solder on the package and substrate so that they interlock to sustain a desired lateral position,

establishing an initial vertical between the package and substrate by utilizing a physical contact of certain of first controlled volumes of solder with their associated second controlled volumes of solder, the initial vertical separation being small enough to allow the predetermined and controlled volumes of solder on each associated pair of pads to touch and coalesce when molten,

applying sufficient heat to an assembly of the package and substrate to achieve a predetermined reflow temperature, such that the first and second volume of solder on each associated pair of pads become molten and coalesce to form a solder joint between a pad on the package and an associated pad on the substrate, and

maintaining a predetermined and controlled final separation between package and substrate after molten solder joint form in order to control a solidified shape of each of the solder joints.

4,878,612

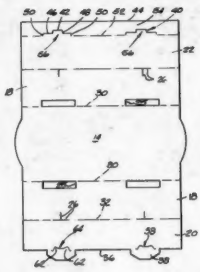
WRAP-AROUND CARTON WITH LOCKING FLAP CONNECTION

Richard L. Schuster, Monroe, La., assignor to Manville Corporation, Denver, Colo.

Filed Apr. 18, 1988, Ser. No. 182,540

Int. Cl.[4] B65D *65/06*

U.S. Cl. 229—40 **11 Claims**



1. In a wrap-around paperboard carton containing an article having a substantially flat surface;

a panel in close face-to-face proximity with the substantially flat surface of the article;

the panel comprising overlapping inner and outer flaps, each flap having an outer edge, an exterior face and an interior face;

the inner flap having a slot forming an edge spaced from the outer edge thereof;

the outer flap having a tab having an outer extremity, the tab extending beyond the outer edge of the outer flap and through the slot in the inner flap;

locking means on the outer flap engaging the spaced edge of the inner flap to secure the flaps together; and

means for holding the locking means in locking condition to prevent withdrawal thereof from the inner flap;

the locking means comprising shoulder means engaging the spaced slot edge of the inner flap;

the outer flap containing a slot spaced from the outer extremity of the tab, the shoulder means being defined by an edge of the slot;

the means for holding the locking means in locked condition comprising tab means on the inner flap engaging the outer flap adjacent the slot therein to hold the shoulder means in position; and

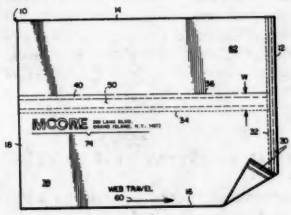
the tab means on the inner flap extending through the slot in the outer flap and being held in position by an edge of said slot, whereby the tab means is maintained in position to hold the shoulder means in place.

4,878,613

ENVELOPE FOR TABLE TOP LASER PRINTER

Ernest E. Badger, Buffalo Grove, Ill.; G. Russell Sornberger, Sanborn, and Michael W. Anderson, West Seneca, both of N.Y., assignors to Moore Business Forms, Grand Island, N.Y.

Continuation of Ser. No. 196,299, May 20, 1988, abandoned.
This application May 1, 1989, Ser. No. 346,334
Int. Cl.[4] B65D *27/06*
U.S. Cl. 229—75 8 Claims



1. An envelope blank assembly for use in the production of envelopes printed by a non-impact type printer comprising:

a first sheet incorporating a front panel portion including a foldable sealing flap portion of an envelope superimposed on

a second sheet incorporating a rear panel portion of said envelope, said first and second sheets being secured to each other along one edge only of said assembly;

at least one of said first and second sheets having a heat activatable adhesive extending along three peripheral edges of the respective envelope panel;

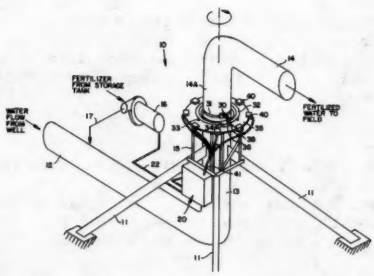
said foldable sealing flap portion of said front panel having a rewettable or pressure sensitive adhesive applied thereto, and a corresponding portion of said second sheet, lying directly beneath said foldable sealing flap portion, having an antistick composition applied thereto.

4,878,614

PROGRAMMABLE FERTILIZER APPLICATION SYSTEM

Clifford C. Hach, and Keith M. Gawlik, both of Loveland, Colo., assignors to Hach Company, Loveland, Colo.

Filed Aug. 3, 1988, Ser. No. 227,707
Int. Cl.[4] A01C *23/04;* A01G *25/09*
U.S. Cl. 239—10 17 Claims



10. A method for determining plant utilization of fertilizer in a field being irrigated by a center pivot irrigation system of the type having a vertical water feed pipe, a horizontal sprinkler boom operably coupled to the upper end of said feed pipe by means of a rotatable connector, and a fertilizer supply means connected to said water feed pipe, wherein said method comprises the steps of:

(a) providing rotation sensor means,

(b) operably connecting said rotation sensor means to said rotatable connector,

(c) providing control means for controlling the amount of said fertilizer supplied to said feed pipe in response to rotation of said horizontal boom,

(d) operably connecting said control means to said rotation sensor means,

(e) irrigating said plants with said irrigation system and adding said fertilizer to said water feed pipe in an amount which varies from one section of said field to another in response to rotation of said sprinkler boom relative to said vertical feed pipe,

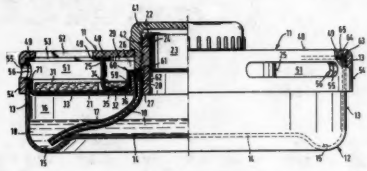
(f) analyzing said plants from each said section of said field to determine said utilization of said fertilizer by said plants in each said section.

4,878,615

FLUID EVAPORATING DEVICES

Salvatore A. Losi, Petit-Lancy, Switzerland, assignor to Givaudan Corporation, Clifton, N.J.

Filed May 20, 1988, Ser. No. 196,414
Claims priority, application Switzerland, May 25, 1987, 2012/87
Int. Cl.[4] A61L *9/04*
U.S. Cl. 239—45 11 Claims



1. A method for the evaporation of a solution which comprises:

(a) introducing a certain volume of said solution (18) into a reservoir (16) having at least one elastic wall (13);

(b) intermittently opening a passage (17,18) connecting said reservoir and a first compartment (26) outside said reservoir, for the transfer of a portion of said solution from said reservoir to said first compartment;

(c) intermittently opening an opening (29) in said first compartment to the ambient air;

(d) exerting an external pressure on said elastic wall of said reservoir, when said opening (29) and said passage (17,18) are open, sufficient to transfer said portion of said solution from said reservoir to said first compartment, and gradually and continuously transferring a portion of the solution (34) contained in said first compartment to an impregnation member (31) consisting of a material capable of absorbing a liquid, said member being placed on a support (21) outside said reservoir and outside said first compartment;

(e) closing said opening of said first compartment and closing said passage; and

(f) keeping said opening and said passage closed during the time intervals between intermittent transfers of portions of said solution from said reservoir to said first compartment.

4,878,616

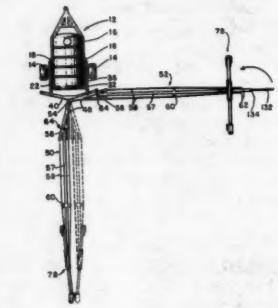
SPRAY BOOM HEIGHT ADJUSTMENT

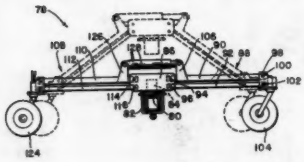
Delmar J. Richardson, 2262 Portage Ave., Winnipeg, Manitoba, Canada

Filed Jun. 16, 1988, Ser. No. 207,490
Int. Cl.[4] B05B *1/20*
U.S. Cl. 239—167 14 Claims

1. An elongate spray boom assembly having an elongate

boom carrier, a plurality of walking beams pivotally mounted on the boom carrier, and ground wheels mounted on the walking beams, wherein each walking beam comprises a pair of parallelogram linkages extending to front and back sides re-





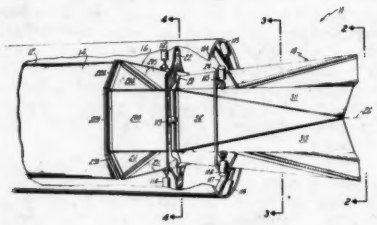
spectively of the boom carrier, each linkage having two boom pivots mounted on the boom carrier and two wheel pivots mounted on a wheel support, and actuating means for pivoting the parallelogram linkages to adjust the height of the boom carrier with respect to the wheels.

4,878,617

TRIPLE AXIS THRUST VECTORING EXHAUST NOZZLE

Rudolph J. Novotny, Stuart, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed May 24, 1988, Ser. No. 198,023
Int. Cl.[4] F02K 1/12
U.S. Cl. 239—265.35 **8 Claims**



1. A thrust vectoring exhaust nozzle for a gas turbine engine, comprising:

a deformable flow duct receiving a flow of engine exhaust gas at an upstream end thereof and discharging said exhaust gas at an open, downstream end thereof,

wherein the deformable duct includes

a plurality of generally planar triangular segments, each segment having one side thereof coefficient with one end of the deformable duct and the other two sides thereof extending the full length of the deformable duct, and wherein

each of the other two sides of each planar triangular segment is hingedly joined the length thereof to one of the other two sides of a next circumferentially adjacent triangular segment, the plurality of hingedly joined triangular segments defining the deformable flow duct;

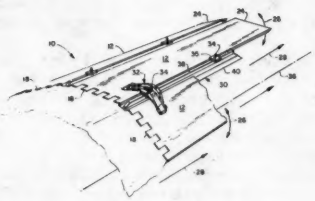
a plurality of actuators, each actuator engaged between a static portion of the nozzle exterior to the deformable duct and at least one of the triangular segments, each actuator adapted to selectively position the triangular segment engaged therewith relative to the nozzle static portion for collectively defining one of a plurality of deformable duct configurations for directing the exhaust gases relative to a central nozzle axis.

4,878,618

WEAR RESISTANT, SELF-DAMPING CLAMP ASSEMBLY

Nick L. Hufnagel, Tequesta, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 8, 1988, Ser. No. 281,162
Int. Cl.[4] F01K 1/12
U.S. Cl. 239—265.39 **7 Claims**



1. A clamp assembly for securing an elongated seal between first and second forwardly hinged exhaust nozzle flaps, the elongated seal including a stiffening ridge extending from the seal between the flaps, wherein the clamp assembly comprises:

a bridge clamp having a pair of circumferentially extending arms, one of said arms extending circumferentially over a portion of the first flap, and the other of said arms extending circumferentially over a portion of the second flap;

a wear plate, disposed intermediate the bridge clamp and the first and second flaps, the wear plate including

a first antirotation means engaged with the elongated seal, and

a second antirotation means engaged with the bridge clamp; and

means, disposed between the elongated seal and the bridge clamp, for securing the bridge clamp and wear plate to the elongated seal.

4,878,619

FLUID SPRAY SYSTEM HAVING A REPLACEABLE CARTRIDGE

Richard O. Norman, San Antonio, Tex., assignor to Environmental Delivery Systems, Inc., San Antonio, Tex.

Filed Nov. 1, 1988, Ser. No. 265,526
Int. Cl.[4] B05B 7/30
U.S. Cl. 239—318 **11 Claims**

1. A fluid spraying system comprising:

a spray gun further comprising:

a first fluid input conduit;

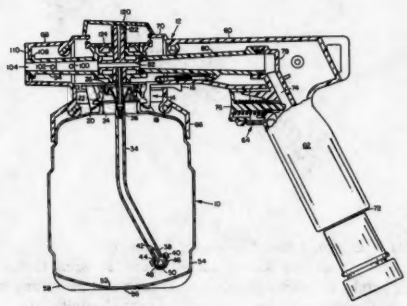
a selector valve having a flow channel in fluid communication with said first fluid conduit, said valve having a second fluid inlet port in fluid communication with said flow channel;

a second fluid discharge conduit for discharging a first

discharge from said selector valve flow channel, said flow channel positionable to alternatively draw from said inlet port or partially discharge to said inlet port;

a means for activating flow of a first fluid through said first fluid input conduit; and

a means for discharging to the environment a discharge from said second fluid discharge conduit; and



an interchangeable and disposable cartridge sealingly engageable with said spray gun, said cartridge further comprising:

a housing for containment of a second fluid within said cartridge;

a means for sealing engagement with said second fluid inlet port ,

a means for delivery of a metered amount of said second fluid to said selector valve.

4,878,620

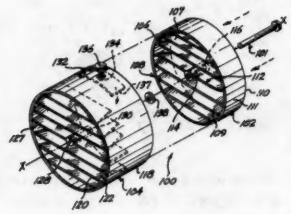
ROTARY VANE NOZZLE

E. Russell Tarleton, 13805 23rd Ave. SE, Bothell, Wash. 98012

Filed May 27, 1988, Ser. No. 200,012

Int. Cl.[4] B05B *1/34;* F24F *7/00*

U.S. Cl. 239—383 21 Claims



1. A nozzle for continuously redirecting the entire volume of a flow of fluid in a predetermined pattern, the fluid flowing along a longitudinal axis, the nozzle comprising:

a continuously rotating first fluid directing means for directing the entire volume of the fluid to flow in a first plane oblique to the longitudinal axis;

means for continuously rotating the first fluid directing means about a rotational axis to thereby rotate the plane of flowing fluid about the rotational axis; and

a second fluid directing means for directing the rotating plane of flowing fluid into a second plane such that the entire volume of the fluid flow continuously laterally reciprocates in said second plane.

4,878,621

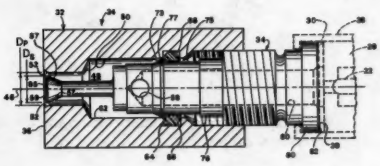
PROJECTING GUN AND NOZZLE

Michael J. Krueger, 812 Cleveland Ave., Kaukauna, Wis. 54130

Continuation of Ser. No. 62,682, Jun. 16, 1987, abandoned. This application Nov. 18, 1988, Ser. No. 274,649

Int. Cl.[4] B05B *1/26*

U.S. Cl. 239—458 21 Claims



1. A nozzle comprising

a housing having a first end, and a passage in said housing, said passage having first and second ends and a longitudinal axis, said passage extending, from said first end of said housing at said first end of said passage, into the interior of said housing, and opening into a chamber in said housing at said second end of said passage, said first end of said passage having a first surface flared outwardly,

a male member in said housing, having an end disposed toward said first end of said passage,

a shaft comprising an elongated constant cross-sectioned portion extending from said end of said male member and from said chamber, through said passage, and an enlarged tip extending from said constant cross-sectioned portion, at a location adjacent said first end of said passage, said enlarged tip having a second surface flared outwardly from said constant cross-sectioned portion of said shaft,

means for introducing a material into said chamber for dispensing said material through said passage,

adjusting means for adjusting the position of said shaft longitudinally in said passage within an operating range, for modifying the pattern of dispensing of said material, including a full open position at a first end of said range wherein said end of said male member is disposed closest to said first end of said passage, thereby opening said nozzle for maximum flow of said material, and

a constant cross-sectioned space between said constant cross-sectioned portion of said shaft and interior walls of a constant cross-sectioned portion of said passage, said constant cross-sectioned space extending outwardly from said second end of said passage, to the first-to-be encountered of said first and second flared surfaces, when said shaft is adjusted in said full open position, with said male member being disposed closest to said first end of said passage.

4,878,622

PERISTALTIC VOLTAGE BLOCK

Chris M. Jamison, and Eric A. Petersen, both of Indianapolis, Ind., assignors to Ransburg Corporation, Indianapolis, Ind.

Filed Jun. 17, 1988, Ser. No. 208,774

Int. Cl.[4] B05B *5/02;* F04B *43/12*

U.S. Cl. 239—690.1 14 Claims

1. A coating material dispensing system comprising an electrostatic high potential supply having an output terminal on which the supply maintains a high electrostatic potential, a source of coating material, a dispenser for dispensing the coating material, means for coupling the dispenser to the source of coating material, means for coupling the output terminal to the dispenser to supply potential to the coating material dispensed by the dispenser, and a peristaltic device having multiple coils of a resilient conduit and a rotor for supporting means for contacting each coil at multiple contact points for substantially

dividing the coating material in the peristaltic device into discrete slugs of coating material substantially to interrupt the

electrical path through the coating material from the terminal to the coating material supply.

4,878,623

PROCESS AND DEVICE FOR MECHANICALLY REMOVING THE SURFACE OF LUMPED GOODS

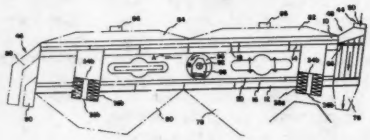
Friedrich W. Plank; Helmut Machnig; Georg H. Mischke, all of Menden; Reinhard Friedrichs, and Norbert Nahrmann, both of Oelde, all of Fed. Rep. of Germany, assignors to Rheinisch-Westfalische Kalwerke AG, Fed. Rep. of Germany

PCT No. PCT/DE85/00553, § 371 Date Feb. 19, 1988, § 102(e) Date Feb. 19, 1988, PCT Pub. No. WO87/03826, PCT Pub. Date Jul. 2, 1987

PCT Filed Dec. 21, 1985, Ser. No. 192,513

Int. Cl.[4] B07C *19/12*

U.S. Cl. 241—5 **40 Claims**



1. Process for mechanical surface removal of lumped lime having a sulphur containing layer, wherein the lumped lime is treated by, starting from a bottom, accelerating the lumped lime by a mechanical impulse and projecting the lumped lime against a processing surface, returning the lumped lime thence to the bottom, and continuing to treat the lumped lime along a conveying path for a predeterminable period of time between the bottom and the processing surface, with the processing surface provided at least over partial sections thereof with profiles, until a desired surface removal is achieved.

4,878,624

PROCESS FOR CONDITIONING LIQUID PETROLEUM

Emmanuel Psaltopoulos, Belmont, Mass., assignor to Hydro Energy Systems, Ltd., Douglas, Isle of Man

Division of Ser. No. 777,963, Sep. 19, 1985, Pat. No. 4,826,089. This application Feb. 13, 1989, Ser. No. 310,329

Int. Cl.[4] B02C *19/12*

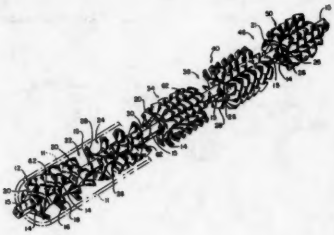
U.S. Cl. 241—29 **11 Claims**

1. A process for treating fuel oil having therein a substantial quantity of asphaltene, said process comprising the steps of

(1) flowing said fuel oil through a conduit, said conduit having therein first array of first shearing elements, said first shearing elements being mounted along the interior of said conduit, said first sharing elements directing said flowing fuel oil into a first helical path,

(2) flowing said fuel oil further through said conduit, said conduit having therein a second array of second shearing elements mounted along the interior of said conduit, said second shearing elements directing said flowing fuel oil into a second helical path generally counter to said first helical path,

(3) flowing said fuel oil further through said conduit said conduit having therein additional arrays of shearing elements disposed serially along the length of said conduit, said additional arrays directing said flowing fuel oil through additional paths in alternating directions, and



(4) maintaining said flowing of said fuel oil at a velocity across said first, second and additional shearing elements, thereby comminuting said asphaltene and dispersing said asphaltene within said fuel oil in a combustible form,

(5) thereby substantially reducing quantities of particulates emanated upon burning of said fuel oil.

4,878,625

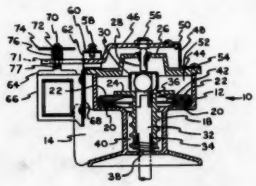
BEAN AND NUT GRINDER SHIFT MECHANISM

Brian D. Newnan, Louisville, Ky., assignor to Grindmaster Corporation, Louisville, Ky.

Filed Jul. 29, 1988, Ser. No. 225,929

Int. Cl.[4] B02C *7/14*

U.S. Cl. 241—37 **18 Claims**



1. In combination with a grinder of the type which includes a housing and an adjustable grinder means disposed in said housing for grinding beans or nuts to a selected particulate size within a range of permissible sizes, a grinder shift mechanism comprising:

biasing means for urging said grinder means toward a predetermined coarse grinding condition to grind beans or nuts to a maximum predetermined particulate size,

shifting means operatively connected to said grinder means for shifting said grinder means from said coarse grinding condition to a first fine grinding condition in opposition to said biasing means to grind said beans or nuts to a minimum particulate size, said shifting means comprising a pivotally movable lever arm for shifting between said coarse and said first fine grinding condition, and

first means operatively connected to said shifting means for automatically activating said shifting means upon command by changing from a first state to a second state.

4,878,626

APPARATUS FOR DESTROYING BANKNOTES

Karl Leuthold; Maul: Herbert, both of Munich; Walter Tröger, Martinsried, and Alexander Serester, Munich, all of Fed. Rep. of Germany, assignors to GAO Gesellschaft fur Automation und Organisation mbH, Munich, Fed. Rep. of Germany

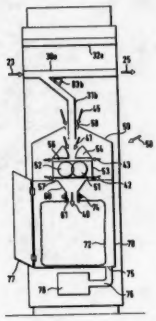
Division of Ser. No. 49,012, May 12, 1987, Pat. No. 4,754,933, which is a continuation of Ser. No. 694,648, Jan. 24, 1985, abandoned. This application Apr. 14, 1988, Ser. No. 181,549

Claims priority, application Fed. Rep. of Germany, Dec. 7, 1984, 3444709

The portion of the term of this patent subsequent to Jul. 5, 2005, has been disclaimed.

Int. Cl.[4] B02C *4/08, 23/26*

U.S. Cl. 241—57 4 Claims



1. An apparatus for high speed shredding documents such as banknotes in a high-speed sorter, in which sorter the documents are removed from a stack one by one, tested according to various criteria and assigned to certain sorting classes as a result of the testing, one sorting class embracing documents which are supplied by a conveyor system to a shredder means and destroyed therein, comprising a shredder means including overlapped cutter disks mounted in fixed, spaced apart relationship on parallel rotatable shafts so that the disks are spaced apart from each other, each cutter disk including peripheral crosscutting notches that are out of registration with notches of adjacent disks;

a collecting means for the document shreds disposed downstream of the shredder in the direction of movement of the documents; and a vacuum pump arranged to produce low pressure in the collecting means;

said collecting means including an entry opening, through which opening air is sucked through the shredder means due to the low pressure in the collecting means; and wherein said shredder means includes air conducting means forming flow channels through and around said cutter disks, said flow channels increasing the velocity of air sucked through the channels such that banknote shreds sticking to the cutter disks are stripped off and that the cutter disks are exposed to a flow of cooling air through and around the cutter disks.

4,878,627

KITCHEN APPLIANCE

Friedrich Otto, Hameln, Fed. Rep. of Germany, assignor to A. Stephen u. Soehne GmbH & Co., Hameln, Fed. Rep. of Germany

Filed Aug. 30, 1988, Ser. No. 238,075

Int. Cl.[4] B01F *7/16;* B02C *18/18*

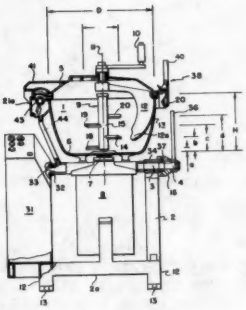
U.S. Cl. 241—199.12 15 Claims

1. A kitchen appliance for the mincing or shredding of food, comprising:

(a) an upwardly open bowl of substantially round cross-section with a bowl bottom;

(b) an upwardly protruding tool shaft perpendicular to the center of the bowl bottom and driven at high speed by a motor arranged underneath the bowl bottom; and

(c) on the tool shaft there is fixed a chopping tool having four radially outwardly extending blades mutually offset at 90° of circumference, which in plan view form a cross; the blades arranged at different axial heights, the lowest blade revolving directly above the bowl bottom and the



highest blade revolving at approximately ¾ of the bowl height (H); each blade having a constant flatly rectangular cross-section over its radial length; each blade being slightly pitched about its longitudinal axis, its longer rectangular side forming an acute angle of pitch (alpha) with the horizontal in such a way that, seen in the direction of rotation, the front edge of each blade is slightly higher than the rear edge thereof; and in plan view, the radial distance (B) between the free ends of two opposite blades, is equivalent to approximately half the maximum bowl diameter (D).

4,878,628

COIL WINDING MACHINE HAVING A TAPE WINDER

Kyoji Takeda, and Yoji Suekane, both of Tokyo, Japan, assignors to Tanaka Seiki Co., Ltd., Tokyo, Japan

Filed May 10, 1988, Ser. No. 192,311

Claims priority, application Japan, May 12, 1987, 62-115197; May 12, 1987, 62-70294[U]; Dec. 18, 1987, 62-192455[U]

The portion of the term of this patent subsequent to Sep. 1, 2004, has been disclaimed.

Int. Cl.[4] B65H *19/20;* H01F *41/12*

U.S. Cl. 242—7.08 7 Claims

1. A coil winding machine having a tape winder, comprising:

a plurality of rotatable spindles capable of holding coil bobbins;

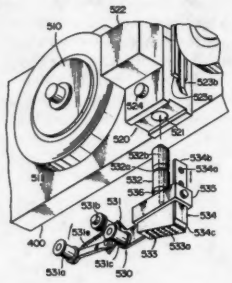
nozzle holder support means for supporting a nozzle holder holding a plurality of nozzles for guiding wires to said coil bobbins, respectively;

a tape winder base, said tape winder base being movable at least vertically relative to said nozzle holder;

means for moving said tape winder base vertically relative to said nozzle holder; and

a plurality of tape winding mechanisms provided on said tape winder base, each of said tape winding mechanisms including a tape support for supporting a tape, a tape

guide mechanism having a plurality of rollers, a pad for pressing said tape against a coil disposed on said coil



bobbin, and a retractable cutter provided adjacent to said pad.

4,878,629

RESERVE WINDING OF YARN ON A TUBE OF A CROSS-WOUND BOBBIN AND METHOD AND APPARTUS OF FORMING SAME

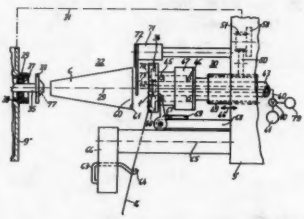
Hans Grecksch, Monchengladbach; Josef Bertrams, Wegberg, and Rene Bucken, Grefrath, all of Fed. Rep. of Germany, assignors to W. Schlafhorst & Co., Fed. Rep. of Germany

Filed Jun. 16, 1988, Ser. No. 208,145

Claims priority, application Fed. Rep. of Germany, Jun. 17, 1987, 3720220; Oct. 2, 1987, 3733353

Int. Cl.[4] B65H *54/02, 54/34*

U.S. Cl. 242—18 PW **13 Claims**



1. A method of forming a reserve winding of yarn on a tube on which yarn is to be cross-wound to build a bobbin comprising drawing at least a few centimeters of yarn centrally into a rotatable tube plate, clamping the end of a tube against the tube plate with the yarn clamped therebetween, guiding the yarn inwardly from the clamped tube end along the surface of the tube to form an initial length of yarn, and rotating the tube and advancing the yarn toward the tube end to form a plurality of substantially non-overlapping windings progressing toward the tube end and overlaying said initial length of yarn.

4,878,630

GUIDE ROLLER ASSEMBLY

Reinhold Schmid, Monchen-Gladbach, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Fed. Rep. of Germany

Filed Feb. 27, 1989, Ser. No. 316,228

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1988, 3806691

Int. Cl.[4] B65H *54/28, 54/20*; F16C *13/02, 33/76*

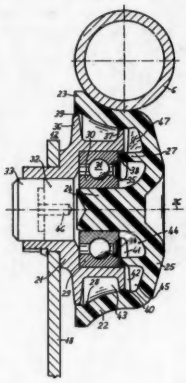
U.S. Cl. 242—43 R **6 Claims**

1. In a textile bobbin winding machine of the type having a reciprocating yarn guide rod for crosswinding yarn bobbins, a guide roller assembly for supporting said yarn guide rod, said guide roller assembly comprising:

an outer shell having an annular rim portion configured for rotational supporting engagement with said yarn guide rod, a central shaft portion, and a continuous wall portion extending between said rim and shaft portions;

a fixed carrier member; and

a lubricated ball bearing assembly interposed between said carrier member and said outer shell for rotatably supporting said outer shell;



at least one of said outer shell and said carrier member having a plurality of annular projecting portions defining a plurality of relatively narrow annular spacings between said outer shell and said carrier member and further defining a plurality of annular air chambers in series between said projecting portions in communication with one another through said spacings, a radially inwardmost one of said air chambers being located in the vicinity of said central shaft portion of said outer shell and a radially outwardmost one of said air chambers being located in the vicinity of said rim portion of said outer shell.

4,878,631

ROLL HOLDER

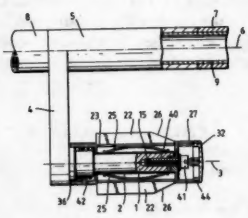
Alexandru Tanovici, Arolsen, Fed. Rep. of Germany, assignor to HEWI Heinrich Wilke GmbH, Fed. Rep. of Germany

Filed Sep. 2, 1988, Ser. No. 240,840

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1987, 3729559

Int. Cl.[4] B65H *75/32*

U.S. Cl. 242—55.2 **11 Claims**



1. Roll holder for a roll which is made from a material web and has a receiving opening, especially a paper roll provided

with perforations running transversely, comprising: a bearing body having a friction surface formed thereon, a shaft with a free face end and an adjusting screw driven into said free face end, said screw having a head; a carrier element containing a tube rotatably mounted on said shaft, serving for at least partial insertion into the receiving opening and being clamped axially between said friction surface and said head; a compression spring held between said friction surface of the bearing body and an associated friction surface of said carrier element; means mounted on said carrier element whereby said roll is held unrotatably on said carrier element; and braking means mounted on the bearing body and on the carrier element for producing a defined braking force when said carrier element rotates on said bearing body, said braking means containing said adjusting screw for regulating said braking force.

4,878,632

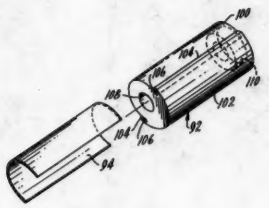
MAGNETIC TAPE CASSETTES

William M. Carroll, Milwaukee, Wis., assignor to Koller Manufacturing Corporation, Milwaukee, Wis.

Division of Ser. No. 101,795, Sep. 28, 1987, Pat. No. 4,819,890, which is a continuation-in-part of Ser. No. 53,348, May 22, 1987, Pat. No. 4,773,615, which is a continuation-in-part of Ser. No. 30,698, Mar. 25, 1987, Pat. No. 4,770,367. This application Jan. 3, 1989, Ser. No. 292,838

Int. Cl.[4] G11B *23/04*

U.S. Cl. 242—199 **23 Claims**



1. A tape guide for use in a magnetic tape cassette comprising an upstanding core affixed to the cassette and having longitudinally-extending slots formed therein, and a polished insert supported on the core and extending about a sufficient arc of the core to provide a bearing surface for contact with the magnetic tape, the insert comprising an elongate sleeve which is split to form longitudinally-extending edges which extend into and are retained by said slats in the core.

4,878,633

DRAG MECHANISM FOR A DOUBLE-BEARING FISHING REEL

Shinichi Morimoto, Nishinomiya, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Apr. 1, 1988, Ser. No. 176,768

Claims priority, application Japan, Apr. 6, 1987, 62-51990[U]

Int. Cl.[4] A01K *89/01*

U.S. Cl. 242—268 **7 Claims**

1. A fishing reel comprising a reel body, a spool rotatably supported relative to said reel body, a drag mechanism for applying a braking force against rotation of said spool, a handle shaft rotatably supported to said reel body and a main gear supported to rotate responsive to rotation of said handle shaft to drive said spool, said drag mechanism comprising:

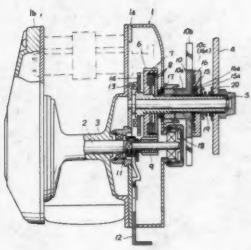
a plurality of drag discs supported to said handle shaft so as to be non-rotatable and axially movable relative to said handle shaft;

a plurality of drag members (i) supported to said handle shaft to be rotatable relative to said handle shaft and (ii) interposed between said drag discs and said main gear;

a load setting member screwably mounted on said handle shaft and for adjustably setting a slipping rotation starting load for said spool applied by said drag members,

a reference member supported to said handle shaft to be non-rotatable relative to said handle shaft and having a single reference portion for setting a reference position corresponding to an optimum value of said slipping rotation starting load set by said load setting member,

an operating member supported to said load setting member



to be rotatable with said load setting member to enable said load setting member to be rotatably operable, said operating member having a single position setting portion for setting a reference position for said load setting member corresponding to said reference position, and

position change means, provided between said load setting member and said operating member, for enabling said operating member to be changed in position with respect to said load setting member.

4,878,634

DEVICE FOR RECEIVING AND SECURING LOADS OR VEHICLE HOOKING SYSTEMS

Michel E. Pacault, 13, rue Bernard Roy, 44100 Nantes, and Jean-Jacques E. Gallet, 37, rue Camille Passarro, 44000 Reze, both of France

Filed Nov. 9, 1987, Ser. No. 117,961

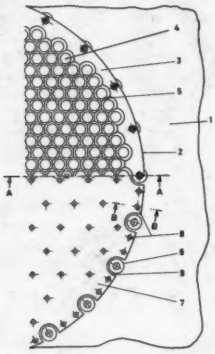
Claims priority, application France, Nov. 19, 1986, 86 16065

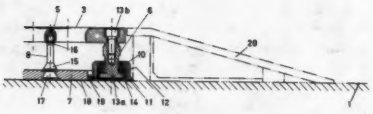
Int. Cl.[4] B64F *1/12*

U.S. Cl. 244—115 **15 Claims**

1. A reception and securing device for a hooking system used for mooring loads or vehicles onto a platform, of the type including one upper perforated plate and support means for said plate, connected together by pillars, wherein said support means comprise one lower plate of approximately constant thickness in contact with said platform, in combination with

said pillars which comprise two shoulders respectively in contact with said upper and lower plates, to make a strong unit





and to provide a constant separation between said upper perforated plate and said lower plate.

4,878,635

CARGO HANDLING SYSTEM

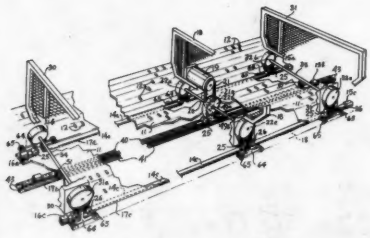
Arnold Nordstrom, Fallbrook, Calif., assignor to Ancra Corporation, Hawthorne, Calif.

Continuation-in-part of Ser. No. 39,709, Apr. 20, 1987, Pat. No. 4,805,852. This application Oct. 24, 1988, Ser. No. 261,784

The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.

Int. Cl.[4] B64C *1/22*

U.S. Cl. 244—137.1 **9 Claims**



1. A cargo handling system for use in moving cargo along the system's floor panel structure which rests on the floor of the loading compartment of a vehicle, to effect the loading and unloading of said compartment comprising:

a main drive panel mounted for longitudinal movement along the floor panel structure;

similar fore and aft end panels mounted for longitudinal movement along the floor panel structure;

belt means extending longitudinally along said floor panel structure and anchored thereto;

drive means mounted on said main panel for driving said main panel in trolley-like fashion along said belt means; and

means for selectively connecting said end panels to the main drive panel such that one or the other of said end panels is drawn by said main drive panel;

said main drive panel while disconnected from said end panels being operable to drive said cargo in a first direction or in a direction opposite to said first direction in loading the cargo in said compartment;

said main drive panel while connected to one or the other of said end panels being operable to draw the connected panel so that the connected panel drives cargo in said compartment in unloading said cargo.

4,878,636

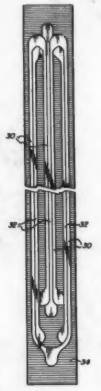
KITE BRIDLE AND LINK SYSTEM AND METHOD FOR MAKING SAME

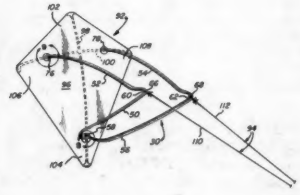
Robert J. Mileti, 21 Taylor St., Torrington, Conn. 06790

Filed Feb. 9, 1989, Ser. No. 308,741

Int. Cl.[4] B64C *31/06*

U.S. Cl. 244—155 A **12 Claims**





1. A detachable bridle for connecting a flying line to a kite, comprising:

a sheet of a bendable polymeric material having high longitudinal strength;

a continuous cut on the sheet which provides a single length of the polymeric material having at least four branches, the four branches being joined at least three joints;

means, located at a middle joint and at ends of the single length, for detachably mounting the single length to the kite; and

means, located at the other two joints, for connecting a flying line to the single length.

4,878,637

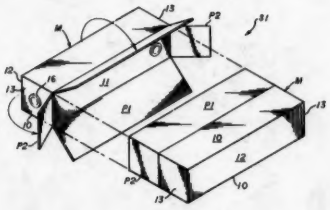
MODULAR SPACE STATION

Charles F. Mullen, 204 Yacht Club La., Seabrook, Tex. 77586

Continuation-in-part of Ser. No. 900,094, Aug. 25, 1986, Pat. No. 4,744,533. This application May 13, 1988, Ser. No. 194,042

Int. Cl.[4] B64G *1/10*

U.S. Cl. 244—159 36 Claims



1. A space station structure assembled in orbit comprising:

a plurality of hollow modules transported into orbit by rocket and joined in spaced relation by panels extending therebetween to form a complete enclosure about a common interior volume, said panels and modules forming the walls of the common enclosure,

said modules forming end walls of the common enclosure and said panels forming adjacent mating side walls of the common enclosure to create a single space station unit having a central area between the joined modules the volume of which approximates or exceeds the sum of the combined volumes of said joined modules.

4,878,638

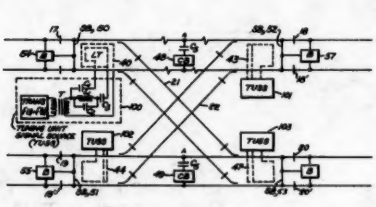
COMBINATION FREQUENCY LOOP COUPLING FOR RAILWAY TRACK SIGNALLING

James R. Hoelscher; Klaus H. Frielinghaus, both of Rochester; Frank A. Raso, Spencerport, and Barry L. Smith, Rochester, all of N.Y., assignors to General Signal Corporation, Stamford, Conn.

Filed Jan. 12, 1987, Ser. No. 2,369

Int. Cl.[4] B61L *21/00*

U.S. Cl. 246—34 CT 18 Claims



1. In a track circuit system using a coupling loop for coupling AC signals to the rails, the improvement comprising a source of signals of different frequency respectively suitable for train detection and train signalling purposes, and coupling means tunable to said different frequencies and having circuits for independently transmitting said different frequency signals in non-interferring relationship, said coupling means interconnecting said source and said loop, said loop having a plurality of turns and presents an inductance LT, and said tunable coupling means comprising a pair of circuits connected in parallel with each other to said loop, and one of which transmits one of said frequencies and the other transmits another of said frequences while blocking said one frequency.

4,878,639

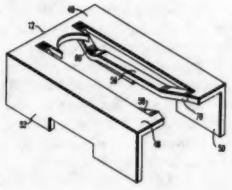
MOUNTING BRACKET FOR A CONDUCTOR OF ELECTRICAL APPARATUS

Dale A. Tempco, Jefferson City, Mo., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 27, 1987, Ser. No. 129,219

Int. Cl.[4] F16L *3/08*

U.S. Cl. 248—73 2 Claims



1. A mounting bracket for use in an electrical apparatus having a terminal bushing to which an electrical cable is detachably connected and having a plug assembly including a base and an insulating plug in which the cable is inserted when removed from the bushing during maintenance, the plug being supported on the base by a bolt having a shaft and a bolt head spaced from the base, a bracket on the apparatus for detachably mounting the plug assembly, the bracket including a plate of sheet material and having a slot extending from one end and dividing the plate into a pair of spaced planar portions, each portion including an inclined runner along each of the opposite sides of the slot, each runner being similarly offset from the plane of the plate and tapered from said one end, whereby the plug assembly is releasably, slidably mounted on the bracket by moving the bolt shaft along the slot from said open end with the bolt head sliding along the adjacent inclined runner so as to slide the base into tight-fitting engagement with the spaced plate portions, and the inclined runner comprising a portion of greater inclination than the runner portion nearer said open end of the slot so as to prevent loosening of the plug assembly due to tolerance variations of assembly parts.

4,878,640

TOOTHED ANCHORING RAIL

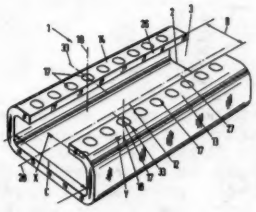
Siegfried Fricker, Str. 30-34, 7135 Wiernsheim, and Klaus Erö hlich, Pforzheim, both of Fed. Rep. of Germany, assignors to Siegfried Fricker, Wiernsheim, Fed. Rep. of Germany

Filed Jan. 21, 1988, Ser. No. 146,515

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1987, 3701530

Int. Cl.[4] E04B *1/41*

U.S. Cl. 248—297.2 4 Claims



1. An anchoring rail for use with a mounting element and having a substantially rectangular hollow shape in cross section at right angles to a longitudinal axis of the anchoring rail and one side of the anchoring rail having arm edges defining a

longitudinal slot of which a width is smaller than the width of the hollow shape cross section;

a fastening element inserted in an interior of the hollow anchoring rail and being shiftable in a longitudinal direction of the anchoring rail;

said fastening element including a threaded bolt having a widened head portion of which the width is greater than the width of the longitudinal slot;

a latching plate arranged and associated with the fastening element;

said latching plate having a width which is equally as large as the width of said longitudinal slot and on a side of said widened head toward a threaded shaft of said fastening element at oppositely located narrow sides of said widened head respectively said widened head portion having engagement surfaces in the form of recessed shoulders offset in level as to said latching plate and on opposite sides of said latching plate, which engagement surfaces lie deeper than said latching plate;

said engagement surfaces being located in the same plane and lying in an engagement position of the fastening element on an inner surface of said anchoring rail arm edges;

said engagement surfaces having multiple pins arranged at right angles to each engagement surface and projecting in a same direction as said threaded shaft and located in the longitudinal direction of the anchoring rail and arranged respectively in two rows located opposite to each other;

a row of holes closed in a peripheral/circumferential direction in both said arm edges of said anchoring rail and in longitudinal spacing similar to that of said pins, each of said holes having axes at right angles to the arm edges;

said pins engaging positively in the holes in the engagement position of said fastening element; and

said latching plate being located in said latter position in the longitudinal slot in such a manner that said latching plate bridges spacing between said arm edges of said anchoring rail.

4,878,641

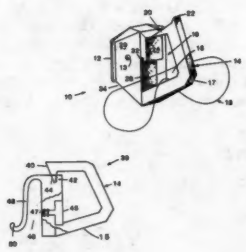
EYEWEAR HOLDER

Paul A. Vogt, 1058 Ottawa Ave., West St. Paul, Minn. 55118

Filed Jun. 27, 1988, Ser. No. 211,999

Int. Cl.[4] A47F *5/00*

U.S. Cl. 248—309.1 **9 Claims**



1. Eyewear storage apparatus comprising:

a body member including a fastener portion mountable to a support surface and a resilient eyewear restraint portion integrally molded with said body member and having a distal end projecting outward relative to said body member to define an eyewear receiving space therebetween, wherein said body member in the region of said eyewear receiving space includes an inwardly extending recess and a plug member detachably mounting to said recess, and wherein said restraint portion is resiliently biased to upon deflection release eyewear contained in the space between said restraint member and body member.

4,878,642

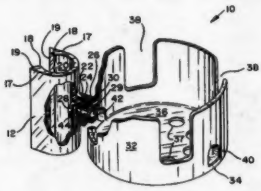
OBJECT SUPPORT FOR ATTACHMENT TO A CYLINDRICALLY SHAPED SUPPORT MEMBER

Emery L. Kirby, Jr., 4052 Antiem St., San Diego, Calif. 92111

Filed Jun. 11, 1986, Ser. No. 872,858

Int. Cl.[4] A47K *1/08*

U.S. Cl. 248—311.2 **8 Claims**



1. An object holder removably attachable to a cylindrical support member comprising:

an upstanding container open at both ends;

a first attachment member carried by said upstanding container and extending substantially perpendicular thereto;

a resilient clamp member having a central bore and an open side wall;

a second attachment member carried by said resilient clamp member and extending substantially perpendicular thereto; and

connecting means selectively length adjustable for locking said first and second attachment members when adjusted to one length and for selective relative rotation therebetween when adjusted to a longer length,

wherein the open side of said resilient member can be forced over said cylindrical support member of a slightly larger diameter than said bore for attachment thereto and said first and second attachment surfaces are rotatably positionable relative to each other and lockable in any selected rotational position by adjusting the length of said connecting means.

4,878,643

WIDE ANGLE MIRROR FOR BIRDHOUSES

Jim E. Stinson, 9508 Wesso Circle, Shreveport, La. 71118

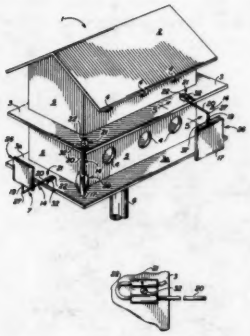
Continuation-in-part of Ser. No. 228,502, Aug. 5, 1988. This application Mar. 6, 1989, Ser. No. 319,299

Int. Cl.[4] G08B *15/00*

U.S. Cl. 248—475.1 **8 Claims**

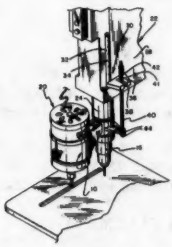
1. A wide angle mirror for reducing the incidence of undesirable, image-sensitive birds nesting in a birdhouse, comprising at least one convex mirror, frame means supporting said convex mirror, an elongated roof having a U-shaped mount leg loop provided in one end, a double-S-shaped bracket adapted to engage said U-shaped mount leg loop provided in said one end of said elongated rod and secure said one end of said elongated rod to the birdhouse, with the opposite end of said elongated rod attached to said frame means, said convex mirror having at least one convex image-reflecting surface of

selected curvature, whereby when the image-sensitive birds view reflected images of themselves in said convex image-



reflecting surface, the image-sensitive birds are frightened from the birdhouse.

4,878,644
ROUTER BRACKET
Charles Downing, R.R. 1, Box 13, Sedan, Kans. 67361
Filed May 20, 1988, Ser. No. 196,678
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—674 **2 Claims**



1. A router bracket comprising a first cylindrical ring means having a first cylindrical structure terminating in a pair of first flanges spaced with respect to each other; a bridge member means bound to said first cylindrical ring; a second cylindrical ring means having a second cylindrical structure terminating in a pair of second flanges spaced with respect to each other; and a lug means gauge means; said lug means has a structure defining a lug aperture for receiving therethrough a depth gauge means; said first cylindrical ring means has a first diameter, and each of said first flanges has a first flange aperture; and a nut-bolt means passing through said first flange aperture of each of said first flanges for compressing together the first cylindrical structure to decrease the first diameter; second cylindrical ring means has a second diameter, and each of said second flanges has second flange aperture; and a second bolt means passing through said second flange aperture of each of said second flanges for compressing together of each of said second flanges for compressing together the second cylindrical structure to decrease the second diameter; said first flanges and said second flanges are generally diametrically opposed to said bridge member means; said bridge member means has a bridge structure tapering from the first cylindrical ring means towards said second cylindrical ring means such that the bridge member has a thickness greater at the point where the first cylindrical ring means bounds to the bridge member means than at the point where the second cylindrical ring means bounds to the bridge member means; said first cylindrical ring means has a first length and said second cylindrical ring means has a second length, and said first cylindrical ring means has a second length, and said first length is greater than said second length; said first diameter is greater than said second diameter; said lug means tapers outwardly such that the lug means has a thickness greater at the point of bounding with the second cylindrical means than at an extremity point not secured to any structure; said lug aperture is in close proximity to said extremity point not secured to any structure; said first cylindrical structure is hollow with a first upper general circular flanged perimeter and with a first lower general circular flanged perimeter, said first upper flanged perimeter and said first lower flanged perimeter respectively extend away from the first cylindrical structure; said second cylindrical structure is hollow with a second upper general circular flanged perimeter and with a second lower flanged perimeter, said second upper flanged perimeter and said second lower flanged perimeter respectively extend away from the second cylindrical structure; said bridge member means is connected to said first cylindrical structure between said first upper flanged perimeter and said first lower flanged perimeter and is connected to said second cylindrical structure between said second upper flanged connector and said second lower flanged perimeter; and additionally comprising a depth gauge means engaged within said lug aperture.

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APPLIANCE RETAINING ADAPTOR
Edward L. O'Neill, San Leandro, Calif., assignor to Lucasey Manufacturing Company, Inc., Oakland, Calif.
Filed Aug. 23, 1988, Ser. No. 235,271
Int. Cl.[4] A47B *97/00*
U.S. Cl. 248—680 **5 Claims**

1. An apparatus for mounting an appliance to a support, said appliance having a housing with a plurality of aligned apertures, said apparatus comprising:

a. first and second carrier plates, each said plate having at least one engaging member offset and extending from said plate terminating on a plane substantially parallel to said plate, said engaging members accommodating a variety of configurations of aligned apertures of said housing and having a size to permit receipt within selected apertures of said housing;

b. means for laterally displacing said first and second carrier plates to vary the spacing between their respective engaging members;

c. means for holding said first and second carrier plates in fixed position to maintain said engaging members in a desired spaced relationship within said selected apertures; and

d. means for attaching said first and second carrier plates to said support.

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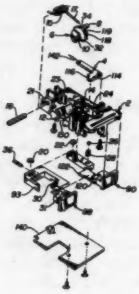
PINCH VALVE MECHANISM FOR A PARENTERAL INFUSION SYSTEM

Howard Edelman, San Francisco, and Carl Ritson, San Jose, both of Calif., assignors to Critkon, Inc., Tampa, Fla.

Filed Aug. 15, 1988, Ser. No. 231,920
Int. Cl.[4] F16L *55/14*
U.S. Cl. 251—9 **11 Claims**



1. A pinch valve mechanism for a parenteral infusion system comprising:

a spring-loaded pinch valve;

means for latching said pinch valve to an open condition, whereby the energy of said spring of said pinch valve is stored;

means, connected to said latching means, for unlatching said pinch valve and releasing said energy of said spring, including a length of wire which contracts upon application of a current; and

means for applying a current to said wire,

whereby the application of current to said wire by said current applying means causes said wire to contract and unlatch said pinch valve.

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PNEUMATIC IMPULSE VALVE AND SEPARATION SYSTEM

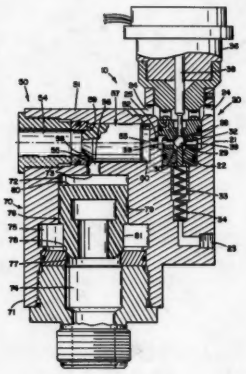
James C. Putt, and Robert N. Hohenshil, both of Doylestown, Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Sep. 2, 1988, Ser. No. 240,030
Int. Cl.[4] F16K *31/40*; B64D *5/16*
U.S. Cl. 251—30.05 **22 Claims**

1. A valve comprising pilot, intermediate and output sections,

the pilot section including a pilot housing containing a pilot cavity, inlet conduit means extending from the exterior of the pilot housing to the pilot cavity, exhaust conduit means extending from the pilot cavity to the exterior of the pilot housing, and intermediate conduit means extending from the pilot cavity to said intermediate section, gate means configured for movement from a load position during which the inlet conduit means is in fluid communication with said intermediate conduit means and a dump position during which the exhaust conduit means is in fluid communication with said intermediate conduit means while said inlet conduit means is disconnected from said intermediate conduit means;

the intermediate section including an intermediate housing containing an intermediate cavity having an inlet port in fluid communication with said intermediate conduit means, an exhaust vent, and an outlet port in fluid communication with output conduit means, the outlet port being proximate to the exhaust vent, and a poppet contained within said intermediate cavity configured for movement from a load position during which fluid under pressure may enter the intermediate cavity and force the poppet to seal off movement of fluid into the exhaust vent while permitting flow of fluid to the outlet port and a dump position during which fluid under pressure may flow from said output conduit means to said vent; the output section including an output housing containing an output cavity having an inlet orifice in fluid communication with said output conduit means, an outlet and accumulation means having an opening to said output cavity proximate to said outlet, and a Piston contained within said output cavity configured for movement from a load position during which fluid under pressure may enter the output cavity through said inlet orifice and force the piston to seal off movement of fluid into the outlet while permitting flow of fluid into the accumulation means, and a dump position during which fluid under pressure may flow from said accumulation means to said outlet.

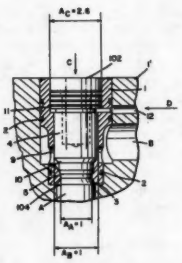


4,878,648

INSERT VALVE

Herbert Strassheimer, Wehrheim, Fed. Rep. of Germany, assignor to Paul Pleiger Maschinenfabrik GmbH & Co., Fed. Rep. of Germany

Continuation of Ser. No. 114,905, Oct. 29, 1987, abandoned. This application Mar. 15, 1989, Ser. No. 323,265
Claims priority, application Fed. Rep. of Germany, Oct. 29, 1986, 3636835
Int. Cl.[4] F16K *31/122*
U.S. Cl. 251—63 **5 Claims**



1. A removable insert valve reciprocally operable for controlling fluid flow in both directions between spaced-apart fluid conducting ports, comprising:

(a) a housing free of springs and having a longitudinally extending passageway;
(b) a valve seat having a beveled sealing surface carried by said housing;
(c) a piston movably mounted for reciprocation in said passageway to and from said seat, said piston having a beveled first surface positioned to directly contact said beveled sealing surface, said piston being free of O-rings or other means of providing a seal except said beveled first surface;
(d) means including one of said ports for applying fluid under pressure endwise against a first endwise surface on said piston to move said piston in a direction away from said seat;
(e) the other of said ports being laterally oriented for sidewise communication of pressure through said housing to said piston;
(f) said piston having a beveled second surface spaced from said beveled first surface and communicating with said sidewise oriented port when said piston is seated on said seat, to move said piston in a direction away from said seat in response to pressure from said sidewise oriented port;
(g) means providing a first control pressure port communicating with said piston for applying fluid under pressure against a second endwise surface on said piston in a direction to move said piston toward and into direct sealing contact with said seat;
(h) means providing a second control pressure port communicating with said piston to move said piston away from said seat;
(i) said piston having a third surface spaced from said first and second surfaces and communicating with said second control pressure port when said piston is seated on said seat, to move said piston in a direction away from said seat in response to pressure from said second control port; and
(j) control means for selectively applying pressure to said first and second control pressure ports for external control of piston movement.

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THROTTLE DEVICE FOR HIGH VISCOSITY PAINT

Youichiro Baba; Hirofumi Hashimoto, both of Toyota, and Masayuki Watanabe, Aichi, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Jul. 15, 1988, Ser. No. 219,402
Claims priority, application Japan, Jul. 24, 1987, 62-183702
Int. Cl.[4] B05B *9/00*; F15D *1/10*; F16K *47/06*
U.S. Cl. 251—121 **12 Claims**

1. A throttle device for applying back pressure to a high viscosity paint in an airless paint supply system having a paint supply pump for supplying paint to a paint spray gun and through the throttling device, said throttling device, comprising:
a tubular member having an inlet and outlet adjacent opposite ends and an inner surface defining a cylindrical through hole of uniform diameter extending axially between the inlet and outlet;
an elongated core member having a uniform outer cylindrical surface concentrically disposed in the through hole and extending substantially throughout the length of the tubular member;
support means mounting the core member in said concentric disposition;
the cylindrical surface of the core member and the inner surface of the tubular member being diametrically dimensioned to define an annular passage between the inner surface of the tubular member and outer surface of the core member having an annulus of at least 1.5 millimeters in radial dimension to permit a flow of paint therethrough while maintaining a selected loss of pressure at the paint spray gun; and
the ratio of the axial length of the annular passage and the radial dimension of the annulus being selected in accordance with the selected loss of pressure at the paint spray gun.

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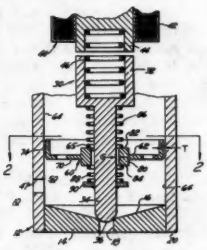
ARMATURE WITH SHEAR STRESS DAMPER

Paul D. Daly, Troy; Mark A. Brooks, Sterling Heights; Robert E. Fallis, Milford, and Mark S. Cerny, Sterling Heights, all of Mich., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Apr. 29, 1988, Ser. No. 188,250
Int. Cl.[4] F16K *31/06*
U.S. Cl. 251—129.15 **25 Claims**

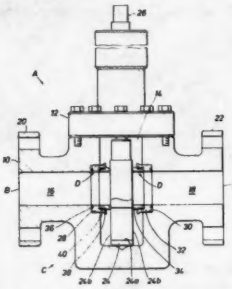


1. An electro-mechanical fuel injector comprising:
a housing and valve seat including a valve seating surface and a metering orifice;
an armature assembly movable relative to the valve seating surface for opening and closing, the metering orifice, including an armature adapted to engage the seating surface;
means for moving the armature assembly comprising:
a coil assembly comprising a coil and a stator magnetically coupled therewith, and when activated operative to move the armature assembly in a direction to open the metering orifice;
and bias means for urging the armature assembly in a direction to close the metering orifice;
a fluid chamber, including a wall, defined upstream of the metering orifice, in surrounding relation to a portion of the armature assembly;
means, resiliently coupled with the armature assembly, within the fluid chamber, including an element spaced from the wall of the fluid chamber for generating a viscous shear force therebetween and in concert with resilient means for preventing the bounce or rebound of the armature;
means for resiliently supporting the element relative to the armature means.

4,878,651
VALVE SEAT ASSEMBLY

Frank W. Meyer, Jr., Montgomery, Tex., assignor to Worldwide Oilfield Machine, Inc., Houston, Tex.

Continuation of Ser. No. 172,436, Mar. 24, 1988, abandoned.
This application Apr. 14, 1989, Ser. No. 338,504
Int. Cl.[4] F16K 1/42
U.S. Cl. 251—172 3 Claims



1. In a through conduit gate valve structure having a valve body defining a valve chamber and inlet and outlet flow passages communicating with the valve chamber, a gate valve member having a port therein mounted within the valve chamber for reciprocal movement between open and closed positions relative to said flow passages, and an annular body pocket at the juncture of each flow passage with the valve chamber with each pocket defining a rear annular shoulder and an outer peripheral surface at right angles to said rear shoulder;

an improved seat assembly mounted in each of said body pockets to provide upstream and downstream seat assemblies; each improved seat assembly comprising:

an outer generally L-shaped seat retaining ring positioned within an associated body pocket in opposed contacting relation to said rear annular shoulder and outer peripheral surface of said body pocket;

said L-shaped retaining ring having an annular shoulder and outer peripheral surface to form a seat pocket therein;

an inner floating seat ring fitting within the seat pocket of said L-shaped outer retaining ring adjacent said annular shoulder and outer peripheral surface thereof, said outer L-shaped seat retaining ring and said inner floating seat ring having annular inner peripheral surfaces of the same diameter as said flow passages and forming a smooth continuation thereof;

said L-shaped retaining ring having a rear face positioned in metal-to-metal contact relation with said annular shoulder of said body pocket and an annular groove in said rear face;

a first O-ring received in said annular groove and maintaining sealing relation between said rear face and said annular shoulder of said body pocket under all conditions of operation of said gate valve structure and blocking fluid flow between the body pocket and retaining ring;

said inner floating seat ring being of a generally rectangular cross-section having a front face engaging the gate valve member in sealing relation, a rear face adjacent the annular shoulder of the seat pocket of said L-shaped retaining ring, and an outer peripheral surface with an annular groove therein;

a second O-ring received within the annular groove of said floating seat ring for sealing between the outer peripheral surface of said seat ring and said outer peripheral surface of the seat pocket of said seat retaining ring;

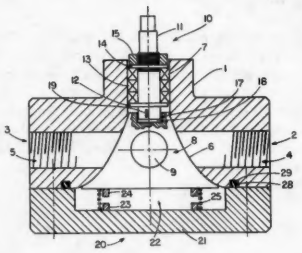
said floating seat ring upon fluid pressure in the adjacent flow passage exceeding the body chamber fluid pressure a predetermined amount moving in a direction toward the gate valve member relative to said L-shaped seat retaining ring for maintaining a tight sealing relation with said gate valve member, said floating seat ring upon fluid pressure in said valve body chamber exceeding the adjacent flow passage pressure a predetermined amount moving out of sealing contact with said gate valve member to permit leakage of fluid from the body chamber into the adjacent flow passage;

the maximum axial spacing between said floating seat ring and said retaining ring being less than the expanded diameter of said first O-ring between the opposed shoulders of said retaining ring and said body pocket thereby to maintain sealing relation between said retaining ring and said body pocket under all conditions of operation for blocking flow of lading from the adjacent flow passage to the outer peripheral surface of said body pocket and the outer peripheral surface of said seat retaining ring.

4,878,652
PLUG VALVE

John J. Wordin, Shelley, Id., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 9, 1986, Ser. No. 861,383
Int. Cl.[4] F16K 25/00, 5/00
U.S. Cl. 251—181 4 Claims



1. An improved plug valve including a valve body having an inlet passage and an outlet passage therethrough, a valve chamber between said inlet and outlet passages, a valve plug having substantially the same shape as said valve chamber and being rotatably disposed therein, said valve plug having a flow passage therethrough, said flow passage disposed such that with said valve plug in a first position, said flow passage is in alignment with said inlet and said outlet passages and provides fluid communication therebetween, and with said valve plug in a second position, said flow passage is not in alignment with said inlet and outlet passages and said valve plug interrupts fluid communication therebetween; and means for rotating said valve plug between said first position and said second position; wherein the improvement comprises:

said valve plug and said valve chamber having the shape of a pseudosphere.

4,878,653
APPARATUS AND METHOD FOR PRE-WIRE ROUTING FOR BUILDINGS

James B. Brown, 17992 Milan Pl., Aurora, Colo. 80155

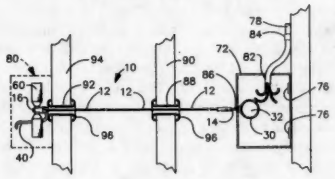
Filed Mar. 15, 1988, Ser. No. 168,270
Int. Cl.[4] B65H 59/00
U.S. Cl. 254—134.3 FT 19 Claims

1. Apparatus adapted for pre-wire routing a building during construction whereby an electrical wire, cable or the like may be drawn along a pathway between first and second terminal locations in a wall portion of the building, comprising:

a strand of flexible material having a selected diameter, a leading end and a trailing end;

an enlarged tail element connected to said strand at the trailing end thereof;

an enlarged head element; and



fastening means having a leader formed of stiff, resilient material attached to said strand at the leading end thereof for selectably connecting said enlarged head element to the leading end of said strand.

4,878,654

METHOD FOR COOLING GASES AND/OR VAPORS FROM NON-FERROUS METAL TREATMENT PLANTS, AND THE RELATIVE APPARATUS

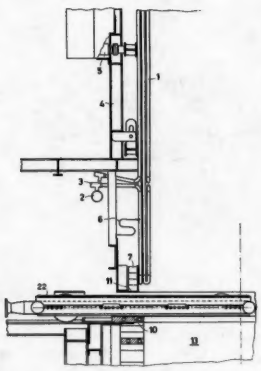
Antonio Carminati, Milan, and Andrea Perillo, Rome, both of Italy, assignors to Snamprogetti S.p.A., Milan, Italy

Filed Sep. 2, 1987, Ser. No. 95,003

Claims priority, application Italy, Sep. 2, 1986, 21566 A/86

Int. Cl.[4] F22D *1/04*

U.S. Cl. 266—159 **11 Claims**



1. An apparatus for cooling offgas which is produced in non-ferrous metal treatment plants and recovering the heat from said offgas which comprises:

a roasting chamber in which the non-ferrous ore treatment is carried out,

an offgas heat recovery chamber disposed above said roasting chamber and having a cross section substantially equal to the upper part of said roasting chamber, said offgas heat recovery chamber comprising a plurality of vertically positioned tubes with surfaces disposed side-by-side in intimate mutual contact to define a cooling shaft structure through which high temperature offgases flow to be cooled,

a vertical metal support structure disposed adjacent to or adhering to said cooling shaft structure, said support structure terminating at a lower end thereof in a fixed ledge which supports a wall composed of one or more courses of refractory bricks which protect said lower end of said metal structure from said high temperature offgases,

header means for introducing pressurized water into said vertically positioned tubes,

means for recovering heated water or steam from said tubes, and

percussion means for engaging with said tubes for shaking-off impurities which deposit on said tube surfaces whereby because said offgas heat recovery chamber is disposed above said roasting chamber, the impurities which are loosened from the tube surfaces caused by the percussion means fall back into the roasting chamber.

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FURNACE CHARGING THROAT CONSTRUCTION

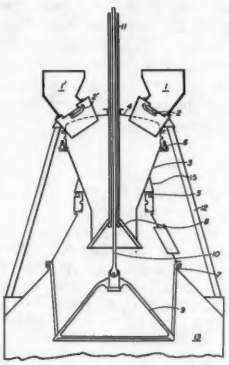
Bernhard Henneken, Oberhausen; Bruno Kämmerling, Dinslaken; Eckhard-K. Scholz, Bottrop; Wolfgang Schröder, Oberhausen, and Hans Krause, Moers, all of Fed. Rep. of Germany, assignors to Man Gutehoffnungshuette, GmbH, Fed. Rep. of Germany

Filed Sep. 24, 1987, Ser. No. 100,526

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1986, 3632724

Int. Cl.[4] C21B *7/18*

U.S. Cl. 266—184 **5 Claims**



1. A furnace charging double-sluice throat stopper construction comprising a stationary hood, an upper sluice hoppr rotatably mounted below and sealable with said hood, drive meanns connected to said upper sluice hopper for rotating said upper sluice hopper around a substantially vertical axis below said hood, at least one charging chute mounted on said hood and opening into said hood and having a lower end entering into said hood with at least one charging flap valve, and means for pressure-sealing said upper sluice hopper in respect to said hood and a lower sluice hopper arranged for charging by said upper sluice hopper.

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SHEET FINISHER

Takeshi Honjo, Kawasaki, and Akimaro Yoshida, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 21, 1988, Ser. No. 171,484

Claims priority, application Japan, Mar. 20, 1987, 62-67487; Mar. 20, 1987, 62-67488; Mar. 20, 1987, 62-67489; Mar. 20, 1987, 62-67490

Int. Cl.[4] B42B *1/02*

U.S. Cl. 270—53 **21 Claims**

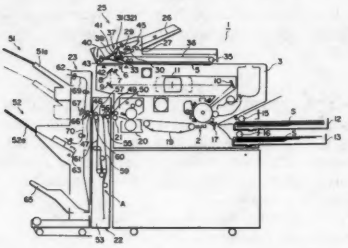
1. A sheet finishing apparatus, comprising:

stacking means for receiving and stacking plural sheets sequentially discharged;

stapling means for acting on a stack of the sheets stacked on said stacking means at a predetermined position of the stack to staple it;

discharging means for discharging from said stacking means the sheets stapled by said stapling means;

an inlet for allowing manual insertion of sheets to said stacking means;



manually operable means for said stapling means; and

automatic control means for actuating said stapling means when a preset number of the sheets are stacked on said stacking means, for actuating said discharging means when a stapling operation is completed, for actuating said stapling means in response to said manually operable means, and for not actuating said discharging means even when the stapling operation responsive to said manual means is completed.

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SHEET CONVEYANCE APPARATUS

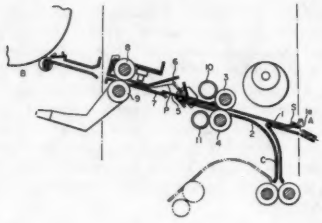
Hiroaki Ura, and Takao Shiozawa, both of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Dec. 21, 1987, Ser. No. 135,435

Claims priority, application Japan, Dec. 24, 1986, 61-310034; Dec. 24, 1986, 61-201993; Dec. 24, 1986, 61-201995; Dec. 24, 1986, 61-201997; Jan. 20, 1987, 62-11164

Int. Cl.[4] B65H *3/44, 5/26, 9/04;* **G03G** *21/00*

U.S. Cl. 271—9 **11 Claims**



1. A sheet conveyance apparatus for a copy machine having a movable photoreceptor for forming a toner image thereon, comprising:

a sheet feed section including

a plurality of tray accommodation means for respectively accommodating a sheet tray containing a stack of sheets, and

a plurality of feed means associated, respectively, with said plurality of tray accommodation means for feeding a sheet to a sheet conveyance section, and

said sheet conveyance section including

guide means for forming a sheet conveyance passage common to said plurality of feed means,

conveyance means disposed along said sheet conveyance passage for transporting to a registration means the sheet fed from said feed means,

said registration means being disposed along said sheet conveyance passage for initially blocking movement of the sheet transported from said conveyance means along the sheet passage, and a selected time interval after the fed sheet reaches the registration means, conveying the blocked sheet to said photoreceptor so that the toner image is transferred onto the sheet, and

said guide means having a loop-forming means between said conveyance means and said registration means for forming a loop in the fed sheet as it is transported by said conveyance means and blocked as its forward end by said registration means;

wherein said sheet conveyance section is formed as one unit and is capable of being adjusted to be located a selected position in relation to said photoreceptor independently from said sheet feed section.

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SHEET DELIVERY DEVICE IN A PRINTING MACHINE

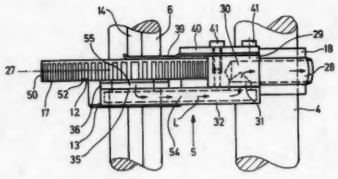
Gerhard Pollich, Heidleberg, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Oct. 11, 1985, Ser. No. 786,850

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1984, 3437584

Int. Cl.[4] B65H *29/68*

U.S. Cl. 271—183 **14 Claims**



1. In a printing machine, a sheet delivery device having pneumatic braking devices of substantially bipartite construction on a chain delivery arragned as rotating brake rollers on a traverse extending beneath the chain delivery transversely to a sheet conveying direction through the printing machine and upstream of a sheet pile, as viewed in the sheet conveying direction, for braking and tightening a sheet exiting from the printing machine, comprising separate suction units with suction air feeding devices operatively associated with the brake rollers for feeding suction air to lateral faces of the brake rollers, at least one of said suction units being selectively associated operatively with at least one lateral face of each of the brake rollers, each of the brake rollers having a sheet-carrying peripheral surface formed with a multiplicity or recesses extending transversley to the sheet conveying direction and distributed adjacent one another over the periphery of the respective brake roller and extending over a region of the width of the respective brake roller, said recesses forming respective breaks in at least one lateral edge of said sheet-carrying peripheral surface and being disposed in a radially outer region of said one lateral face of the respective brake roller, said suction units being formed with lateral air outlet openings located at a respective radially outer segment region of said one lateral face of the respective brake roller.

4,878,659

METHOD OF AND APPARATUS FOR GATHERING AND MANIPULATING STACKS OF PAPER SHEETS AND THE LIKE

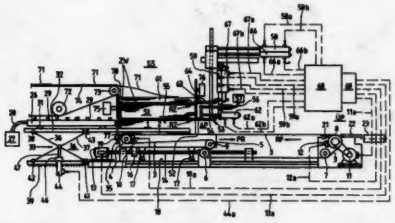
Alfred Besemann, Hamburg, Fed. Rep. of Germany, assignor to E.C.H. Will GmbH, Hamburg, Fed. Rep. of Germany

Filed Dec. 10, 1987, Ser. No. 131,369

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1986, 3642259

Int. Cl.[4] B65H *31/12*

U.S. Cl. 271—218 **37 Claims**



1. A method of accumulating and manipulating stacks of sheets, comprising the steps of gathering sheets into a series of stacks at a first station, including feeding sheets into the first station from above to form a first growing stack and a second growing stack on top of the first stack when the latter is fully grown; and advancing successive stacks of the series from the first to a second station, including supporting successive stacks from below, holding successive stacks from above, at least during the initial stage of advancement from the first station, said holding step including engaging the upper side of the fully grown first stack by a first jaw to thus separate the fully grown first stack from the growing second stack thereabove, engaging the second stack when fully grown from above by a second jaw, and lowering the second stack and the second jaw upon completed removal of the first stack from the first station.

4,878,660

SORTER

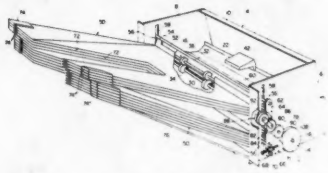
Yoichiro Irie, Suita, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

Filed Jul. 22, 1988, Ser. No. 222,781

Claims priority, application Japan, Jul. 28, 1987, 62-186694; Aug. 12, 1987, 62-199894; Sep. 17, 1987, 62-231031

Int. Cl.[4] B65H *39/11*

U.S. Cl. 271—293 **6 Claims**



1. A sorter provided with a plurality of vertically arranged bin trays, the bin trays respectively having a widthwise projecting trunnion in at least one side thereof, the trunnions being vertically stacked and being movable in the stacking direction along a predetermined moving passage, and a transfer mechanism for elevating and lowering the trunnions successively one by one through the predetermined transfer passage and spacing adjacent bin trays from each other vertically at their sheet receiving ends to form a sheet receiving opening between them; wherein

the transfer mechanism includes a pair of cooperating rotating cam plates and a rotating means,

each of the rotating cam plates has at least one trunnion receiving groove extending radially and being open at its radially outside end and an outer circumferential cam surface extending continuously in the circumferential direction excepting a site corresponding to the trunnion receiving groove, and the outer circumferential cam surface is a convoluted surface whose radius increases progressively in a given rotating direction,

the pair of rotating cam plates are arranged such that their rotating central axes are positioned on both sides of the predetermined moving passage, a straight line connecting the rotating central axes crosses the predetermined moving passage obliquely, and that they move toward and away from each other in a predetermined rotating angular relation at a part at which the straight line connecting their rotating central axes crosses the predetermined moving passage, and

the rotating means rotates the pair of rotating cam plates synchronously in opposite directions to each other.

4,878,661

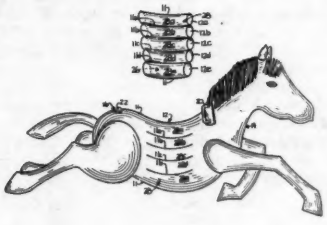
INFLATABLE BULBOUS TOY HAVING A SUBSTANTIALLY NON-BULBOUS CENTER SECTION

Henry S. Wolfe, Gulfport, Fla., assignor to The Frenry Company, Clearwater, Fla.

Continuation-in-part of Ser. No. 927,458, Nov. 6, 1986, abandoned, and a continuation-in-part of Ser. No. 895,263, Aug. 11, 1986, Pat. No. 4,770,408. This application Jul. 6, 1988, Ser. No. 215,629

Int. Cl.[4] A63G *19/00*

U.S. Cl. 272—52 **4 Claims**



1. An inflatable ridable toy device of the type formed by welding together sheets of flexible material at their respective peripheral edges comprising:

a first bulbous portion;

a second bulbous portion;

a center section interposed between the first and second bulbous portions having a transverse diameter narrower than the transverse diameter of the first and second bulbous portions;

the center section being suitable for straddling by a standing child; and

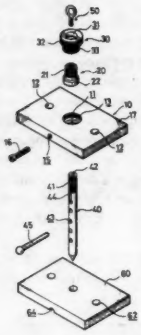
the center section being formed between the peripheral edges by welding together the sheets along a plurality of at least four vertically spaced apart weld lines each adjacent pair of center section welds creating a longitudinal compartment between the welds, the compartment being open ended and in fluid communication with the first and second bulbous portions.

4,878,662

EXERCISE MACHINE WEIGHT GUIDE

Lu-Meng Chern, No. 4, Lane 42, Holi St., Taiping Hsiang, Taichung Hsien, Taiwan

Filed Jan. 24, 1989, Ser. No. 301,040
Int. Cl.[4] A63B *21/06*
U.S. Cl. 272—118 **2 Claims**



1. An exercise machine weight guide, comprising

an uppermost plate (10) having a mounting hole (11) and two guide post holes (12); said mounting hole (11) being stepped with an upper larger threaded hole (13) and a lower smaller smooth hole (14);

an internally threaded plug (20) having a narrower cylindrical end (21) and an annular lip (22); said annular lip (22) having an outer diameter slightly larger than said lower smaller smooth hole (14) and smaller than said larger threaded hole (13);

a securing plug (30) having a stepped central hole (31) which is complementary in shape and engageable to said threaded plug (20); said securing plug (30) consisting of a larger upper section (32) and a smaller externally threaded lower section (33), said threaded lower section (33) being engageable to said upper threaded hole (13) of said uppermost plate (10);

a weight post (40) having a threaded end (41) which is threadedly engageable to said internally threaded plug (20) and a centrally axially threaded hole (42) for threadedly engaging a threaded screw eye (50); said weight post (40) having a plurality of apertures (43) evenly spaced lengthwise thereon so that a connector pin (45) is slidably insertable therein.

4,878,663

DIRECT DRIVE REHABILITATION AND FITNESS APPARATUS AND METHOD OF CONSTRUCTION

Michael M. Luquette, Lafayette, La., assignor to Innovative Therapeutic Designs, Inc., Oakland, N.J.

Filed Nov. 8, 1988, Ser. No. 268,783
Int. Cl.[4] 272 *67, 117*
U.S. Cl. 272—134 **29 Claims**

1. A rehabilitation and fitness apparatus comprising, in combination:

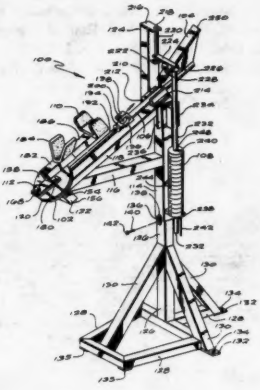
means for supporting said apparatus;

an actuator arm mounted to said supporting means, said actuator arm being pivoted for providing rotational motion;

means in communication with said actuator arm for limiting the range of rotational motion of said actuator arm;

direct driving means connected to said range limiting means and a surface for converting said rotational motion of said actuator arm to translational motion of said surface; and

means for resisting the rotational motion of said actuator arm, said resisting means being vertically movable along said surface in relation to the translational motion of said direct driving means, said actuator arm being rotatably



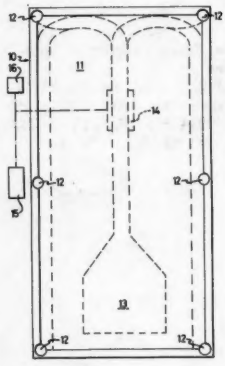
operable through opposing patterns of movement for therapeutically exercising opposing muscle groups by adjusting said range limiting means.

4,878,664

POKER POOL GAME

David L. Brookes, Auckland, New Zealand, assignor to Development Finance Corporation, Auckland, New Zealand

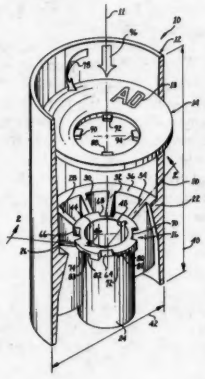
Continuation-in-part of Ser. No. 452,729, Dec. 23, 1982, Pat. No. 4,516,770. This application Oct. 24, 1984, Ser. No. 664,365
The portion of the term of this patent subsequent to May 14, 2002, has been disclaimed.
Int. Cl.[4] A63D *15/00*
U.S. Cl. 273—11 R **2 Claims**



1. A table ball game comprising a playing surface and ball traps, electronics detection means associated with one or more of the ball traps, a plurality of visually distinguishable balls having individually distinct electronic identification means associated therewith capable of being detected and individually distinguished from each other by said electronic detection means, said electronic detection means being coupled to scoring means to record the entry of balls into said ball traps, wherein the balls, other than a "cue ball", are marked with

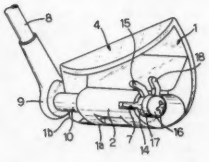
numbers or letters, and also with symbols, that correspond to card values in a standard pack of playing cards.

4,878,665
GOLF CUP ADVERTISING DEVICE AND METHOD
Louis H. Boudreau, and Scott R. Ketterer, both of Phoenix, Ariz., assignors to Boudreau/Darque, Inc., St. Louis, Mo.
Filed Dec. 30, 1988, Ser. No. 292,364
Int. Cl.[4] A63B *57/00*
U.S. Cl. 273—34 R **8 Claims**



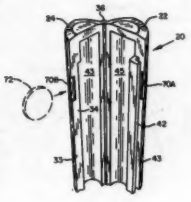
1. A golf cup advertisement device including:
a golf cup unit having an axis;
an insert disc having an advertisement thereon and disposed coaxially inside the cup unit; and
connection means for connecting the disc to the cup unit, wherein
the connection means comprises:
a tubular member having a cylindrical outer surface with a tapered cam groove and being supported by the cup unit; and
said disc having a radially inner portion with a cylindrical inner surface for receiving the tubular member and having at least one radial prong which is received in the tapered cam groove.

4,878,666
GOLF CLUB
Rokuro Hosoda, 1-29-13, Akatsuka, Itabashi-ku, Tokyo, Japan
Filed Sep. 30, 1988, Ser. No. 252,172
Claims priority, application Japan, Oct. 9, 1987, 62-154086[U]
Int. Cl.[4] A63B *53/06*
U.S. Cl. 273—79 **10 Claims**



1. An adjustable golf club having a handle, shaft, and a club head assembly, comprising:
a spline shaft projecting from the lower end of the club shaft;
a sleeve provided at the back of said club head for permitting insertion of said spline shaft, said sleeve including a mouth end;
said spline shaft connected to a spline hole in said sleeve by spline engagement means such that the angle of the club head with respect to the club shaft may be selectively adjusted;
said club head including a club face having at its upper edge a putting surface located in a plane substantially normal to said club face and facing generally the back of the club head;
a slit provided longitudinally along said sleeve at the back of said club head located proximate said mouth end of said sleeve;
said spline shaft further including a tip end projecting from said mouth end engaged with a bush having an inner and outer end, wherein said bush is rotatably mounted about the outer periphery of said spline shaft;
a coil spring inserted in said spline hole of said sleeve between said spline engagement means and said inner end of said bush;
said outer end of said bush attached to said tip end of said spline shaft by means of a bolt head which screws into said tip end of said spline shaft; and
said bush further including a lever abutting against said mouth end of said sleeve to prevent accidental disengagement of said spline engagement means.

4,878,667
REPLACEABLE, REUSABLE GOLF CLUB GRIP
John Tosti, 5727 Buena Vista Dr., Vancouver, Wash. 98661
Filed May 24, 1988, Ser. No. 198,060
Int. Cl.[4] A63B *53/14*
U.S. Cl. 273—81.2 **14 Claims**



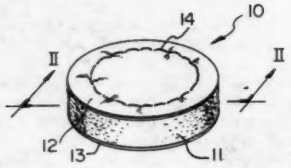
1. A gold club grip comprising:
a pair of elongate sections substantially equal in length, together defining an interior channel sized for engagingly receiving a golf club shaft, the top end of the shaft being covered by the grip;
hinge means connected to each of the elongate sections for pivotally opening and closing the sections; and
locking means connected to each said sections for releasably securing the sections in mating relation to each other to lock the grip onto the shaft for forming a unitary golf club grip, said locking means including a first flange having an L-shaped cross-section connected along the end of a first one of said sections and extending axially outward away from said interior channel; and a second flange having an L-shaped cross-section connected along a corresponding end of the other one of said sections and extending axially inward toward said interior channel; said first flange and said second flange sized and positioned relative to each other to interlockingly engage each other to releasably secure the sections to each other and form a substantially continuous external surface of the grip.

4,878,668

INDOOR HOCKEY PUCK

Victor Nevoral, 1189B Baity Avenue, Quesnel, British Columbia, Canada V2J 5G5

Filed Apr. 14, 1987, Ser. No. 38,324
Claims priority, application Canada, Apr. 14, 1986, 506564
Int. Cl.[4] A63B 71/00
U.S. Cl. 273—128 R 6 Claims



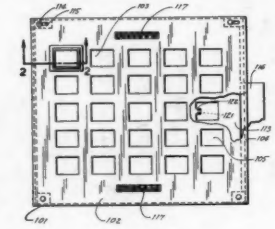
1. A floor hockey puck in the form of a cylindrical disc having the size and shape of a conventional hockey puck, said puck having an inner relatively thick layer of felt material and two outer relatively thin cylindrical discs of leather material, said inner layer being substantially continuous throughout its volume between said two outer discs, and means connecting each of said outer discs to opposite flat sides of said inner layer.

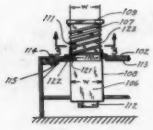
4,878,669

BINGO CARD MARKER

Jaroslav Premysl, 5865 S. 31st St., Milwaukee, Wis. 53221

Filed Feb. 13, 1989, Ser. No. 309,733
Int. Cl.[4] A63F 3/06; B43K 27/08
U.S. Cl. 273—148 R 1 Claim





1. Bingo Card Stamping Apparatus comprising:

a. a hollow rectangular base containing a matrix of rectangular holes in the top thereof which are spaced so that they are in alignment with the locations on a bingo card, the length and width of said holes being any convenient size;

b. a rectangular plate which is affixed to the inside of the hollow rectangular base by any suitable means and is in parallel alignment with the top of the base, the distance between the top of the base and the plate being determined by convenience, said plate containing a matrix of holes which are also in alignment with the locations on a bingo card and are slightly wider and longer than the holes in the base;

c. a rectangular set-reset plate which is in parallel arrangement with and slidably attached to the inside of the top of the base by any convenient means, said set-reset plate having a matrix of rectangular U-shaped holes, the open end of the U being formed by a tab of any convenient shape, which extends into the otherwise rectangular holes on the left side, the length of said holes being slightly greater than the length of the tab plus the length of the holes in the top of the base and the width of said holes being the same as the width of the holes in the base, the set-reset plate having an extension on the right side which provides the means for moving the set-reset plate to the left;

d. spring means attached on one end to the set-reset plate and on the other end to the top of the base for urging the set-reset plate to the right;

e. a plurality of buttons having an upper barrel and a lower barrel, the dimensions of the transverse cross section of the upper barrel of the button being slightly less than the dimensions of the holes in the top of the base so that the upper barrel may slidably pass therethrough, the dimensions of the cross-section of the lower barrel of the button being slightly less than the dimensions of the holes in the rectangular plate so that the lower barrel may slidably pass therethrough, each button having a left side and a right side, the left side of the upper barrel of each button containing a notch which is slightly larger than the tab which projects into the holes in the set-reset plate and which may engage said tab thereby locking a button in a downward position, a ramp on the left side of the upper barrel of each button which may contact the tab and cause the tab to flex in a downward direction in response to downward movement of a button until the tab falls into said notch;

f. stamping means, which is attached to the bottom of the lower barrel of each button; and

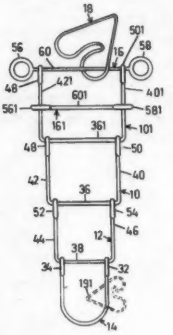
g. spring means surrounding the barrels of the buttons for urging said buttons to return to an upward position.

4,878,670

HEART PUZZLE

Larry W. Bernauer, 1214 Arlington Ave., Davenport, Iowa 52803

Filed Sep. 30, 1988, Ser. No. 251,343
Int. Cl.[4] A63F 9/08
U.S. Cl. 273—158 6 Claims



1. A puzzle comprising:

a first crossbar having a loop at each end,

a first U-shaped element having loops at the upper ends of its upstanding portions with the horizontal portion of said crossbar extending through these loops,

a second U-shaped element having loops at the upper ends of its upstanding portions with the rung of said first U-shaped element extending through these loops,

a third U-shaped element having loops at the upper ends of its upstanding portions with the rung of said second U-shaped element extending through these loops,

a second crossbar having a loop at each end, said loops of said second crossbar respectively encircling the upstanding portions of said first U-shaped element, and

a separate movable game piece of a heart shaped configuration that mey be engageable with said first crossbar and then sequentially engageable with said first, second, and third U-shaped elements,

said game piece having a looped tongue insertable portion with spaced sides extending from a throat portion insertable into said loops and passable over said loops in accomplishing said sequential engagements, said game piece having enlarged rib portions thereof to prevent passage of said game piece through said loops, said game piece enlarged portions being in a flat plane and said insertable portion extending out of said plane.

4,878,671

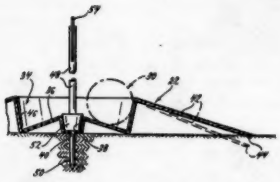
YARD GOLF GAME APPARATUS

Peter M. Gubany, #6 Oakbriar Farm Ct., Ballwin, Mo. 63021

Filed Nov. 9, 1988, Ser. No. 268,984

Int. Cl.[4] A63B *69/36*

U.S. Cl. 273—176 R **13 Claims**



1. A game apparatus including a device for forming a simulated hole for a golf-type game in which players strike a ball to propel it into the hole, the device comprising:

a generally circular cup sized to receive the game ball, the cup having an opening generally in the center;

a generally frustoconical resilient flange surrounding the cup, the flange sloping downwardly and radially outwardly from the rim of the cup, the lower lip of the flange extending below the bottom of the cup in its uncompressed state;

a flag pole for anchoring the apparatus, the flag pole adapted to extend through the opening in the cup and embed in the ground below the cup, the flag pole including means for engaging the bottom of the cup to hold the cup down and compress the resilient flange to hold the lip of the flange against the ground.

4,878,672

GOLF CLUB WITH SWING SPEED INDICATOR

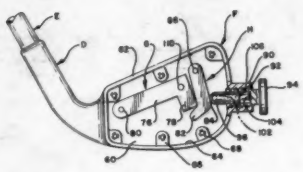
Robert F. Lukasiewicz, Hinsdale, Ill., assignor to Ram Golf Corporation, Melrose Park, Ill.

Division of Ser. No. 53,612, May 26, 1987, abandoned. This application Jul. 11, 1988, Ser. No. 220,374

Int. Cl.[4] A63B *69/36*

U.S. Cl. 273—186 A **5 Claims**

1. A fitting golf club for determining the flexibility of a golf club shaft, said fitting golf club including an elongated shaft having one shaft end portion adapted to be grasped in a person's hands and an opposite shaft end portion, a fitting golf club head attached to said opposite shaft end portion, and adjustable means on said golf club head adjustable between a plurality of different positions, indicia for determining a particular position of adjustment, and mechanisms associated with said adjustable means operative responsive to the centrifugal force applied upon swinging of the fitting golf club, said mechanisms including a weight pivotally mounted within said head on an axis perpendicular to said shaft and parallel with the swing direction, said weight being movable between an armed position adjacent the upper side of said head to a released



position adjacent the lower side of said head, the optimum shaft flexibility for said person being determinable by comparison of the release of said weight with the position of adjustment of said adjustable means.

4,878,673

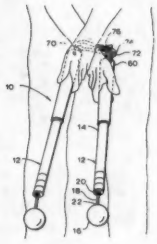
GOLF CLUB SWING TRAINING METHOD

Theodore Pollard, Miami, Fla., assignor to Objective Golf, Inc., Miami, Fla.

Filed Jan. 19, 1988, Ser. No. 145,151

Int. Cl.[4] A63B *69/36*

U.S. Cl. 273—186 C **24 Claims**



1. A method of training oneself to properly swing a golf club comprising the steps of:

(A) providing a golf swing training device comprising a pair of training sticks, separate and independently movable relative to one another, each of said training sticks having a shaft having upper and lower ends, a weight, and flexible elongate means of fixed length connecting said lower end of said shaft and said weight; and

(B) practicing movements associated with a golf swing while swinging the training sticks in a prescribed pattern of exercise with each hand holding a different one of the shafts by an upper end thereof.

4,878,674

ILLUMINATED TRANSLUCENT GOLF BALL

Nelson F. Newcomb, and Nelson F. Newcomb, Jr., both of Mirror Lake, N.H. 03853

Continuation of Ser. No. 816,236, Jan. 6, 1986, Pat. No. 4,695,055. This application Sep. 18, 1987, Ser. No. 98,521

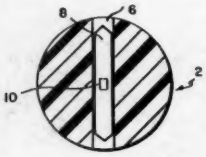
The portion of the term of this patent subsequent to Sep. 22, 2004, has been disclaimed.

Int. Cl.[4] A63B *43/06*

U.S. Cl. 273—213 **3 Claims**

1. A solid golf ball comprising a molded spherical body comprising a translucent plastic, said ball being not less than

1.680 inches in diameter nor over 1.620 ounces in weight, and said ball having one permanent diametrically extending hole



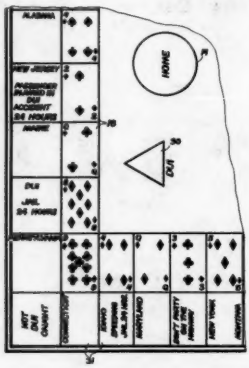
passing at least partially therethrough for receiving a chemiluminescent light stick and illuminating the ball for night play.

4,878,675

EDUCATIONAL AND AMUSEMENT GAME

Timothy Perry, and Leroy Perry, both of P. O. Box 788, Ellicott City, Md. 21043

Filed Aug. 10, 1988, Ser. No. 230,593
Int. Cl.[4] A63F *3/00, 3/06*
U.S. Cl. 273—251 **5 Claims**



1. A method of playing an entertainment and amusement game comprising,

providing a game board with a top surface including a plurality of player stations wherein each player station includes a Home space and a first Control pointed space and a second D.U.I. pointed space wherein each of said pointed spaces are on opposite sides of Home space, and

A first continuous series of inner spaces on said game board top surface associated with said first pointed space, and

a second continuous series of outer spaces contiguous to and adjacent to said first spaces associated with said second pointed space,

each respective point of said first and second pointed space is pointing to a respective starting space of said first and second series of spaces, and

further providing two decks of conventional playing cards including two Jokers per each deck to provide one hundred and eight playing cards, and

providing an arbitrary emblem for each of said players, and

providing a predetermined number of reward and penalty cards wherein each of said reward and penalty cards include a statement and a consequence of said statement, and

providing a predetermined number of question and answer cards, and wherein said question and answer cards are divided into four series wherein each of said series is associated with each of four suits associated with playing cards, said suits include clubs, diamonds, hearts, and spades

providing a game card for each of said players, and

providing a predetermined number of tokens for use with each of said playing cards for each player, and providing a dice, and wherein

each player initially rolls a dice to proceed from the Home space to the first pointed space upon rolling a predetermined number on said dice, and each player in turn rolls the dice to determine a number of spaces to traverse in a clockwise manner of about said game board on said first series of spaces, and

each space of said first series of spaces corresponds to a conventional playing card by suit and designation wherein upon landing on said space, a player guesses that a card chosen from said deck of conventional playing cards will be higher, lower, or the same as the space the player has landed upon, and

a upon a correct guess, the player positions one of said tokens on a space of a game card secured by said player, and

said game card includes designations corresponding to said conventional playing cards and the player positions a token on the game card only if the game card includes a designation corresponding to the space landed upon by the player, and

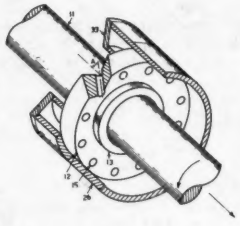
optionally, if a player incorrectly guesses the chosen playing card the player selects a single of said plurality of question and answer cards and upon a correct answer, the player positions a token on said game card.

4,878,676

SEAL-FLUSHING IN CENTRIFUGAL-PUMPS, IMPROVED METHODS AND APPARATUSES

John W. Johnson, Cuidad Bolivar, Venezuela, assignor to Chaldar, Inc., Denver, Colo.

Filed Sep. 18, 1987, Ser. No. 98,205
Int. Cl.[4] F16J *15/00;* **F01D** *15/00*
U.S. Cl. 277—24 **2 Claims**



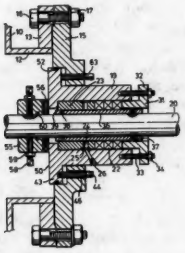
1. In a pump shaft sealing assembly, comprising a pump shaft having an impeller, a seal assembly for said pump shaft, a housing enclosing said seal assembly; the improvement of a method of flushing said seal assembly, said method comprising the steps of: (a) injecting pressurized seal flush fluid into said seal housing on a side of said seal opposite said impeller such that the flush fluid flows axially forwardly over said seal assembly towards said impeller; (b) causing said flush fluid to be injected equally circumferentially spaced about the periphery of the seal; and (c) continuing to inject said flush fluid in a direction at an acute angle to the axis of said pump shaft in the direction of rotation of the impeller."

4,878,677

SHUT OFF SEAL ABOUT A SHAFT OF A DEVICE HAVING A SIDE ENTRY INTO A TANK

David J. Larkins, Brampton, and John C. Schneider, Acton, both of Canada, assignors to Hydrochem Developments Ltd., Brampton, Canada

Filed Dec. 15, 1988, Ser. No. 284,556
Int. Cl.[4] F16J *15/00*
U.S. Cl. 277—105 9 Claims



1. A shut off seal in a device having a rotatable shaft extending through a nozzle side entry structure of a tank, comprising:

a mounting flange attachable to the nozzle structure;

a housing about the shaft, the housing having a flanged end which is releasably attachable to the mounting flange and which is sized to enable it to enter the nozzle structure, said flanged end having a flat outer surface;

releasable attachment means for attaching the flange of the housing to the mounting flange;

sealing means between the mounting flange and the housing;

packing about the shaft within the housing, the packing providing a seal about the shaft and lubricating the shaft when it is rotating;

a collar having a sealing ring at one end thereof, the collar being attached to the shaft with the sealing ring facing the flat outer surface of the flanged end of the housing, the collar being spaced slightly from the housing when the housing is attached to the mounting flange; and

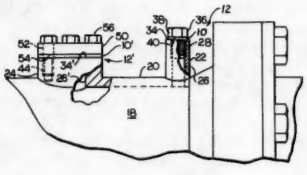
means for sliding the housing into engagement with the sealing ring of the collar so that the sealing ring and the flat outer surface of the flanged end of the housing form a seal about the stationary shaft while also maintaining the seal between the mounting flange and the housing.

4,878,678

HIGH TEMPERATURE METALLIC GASKET

John J. Hensley; Christian M. Waldhelm, both of San Diego; Henry J. Tohill, Chula Vista, and Kenneth G. Kubarych, Del Mar, all of Calif., assignors to Solar Turbines Incorporated, San Diego, Calif.

Filed Jul. 9, 1987, Ser. No. 71,438
Int. Cl.[4] F16J *15/08*
U.S. Cl. 277—235 A 15 Claims



1. A metallic gasket comprising:

a substantially non-compressible metallic sheet having at least one opening therethrough and opposite sides;

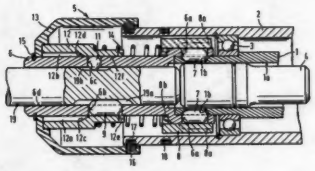
at least a pair of seals each being connected to a portion of the sheet circumferentially around the opening on each side of the sheet, said seals being formed of a metallic material having sufficient ductility to sealingly conform to a surface to be sealed when a predetermined compressive load is applied thereto, said pair of seals having a thickness which falls within the range of from 0.10 mm to 0.30 mm a width which falls within the range of from 1 mm to 3 mm.

4,878,679

VARIABLY OPERABLE HAND-HELD DEVICE

Uto Plank, Freising; Anton Neumaier, Fürstenfeldbrück, and Erwin Manschitz, Germering, all of Fed. Rep. of Germany, assignors to Hilti Aktiengesellschaft, Fürstentum, Fed. Rep. of Germany

Filed Jul. 1, 1988, Ser. No. 214,491
Claims priority, application Fed. Rep. of Germany, Jul. 1, 1987, 3721771
Int. Cl.[4] B23B *31/04*
U.S. Cl. 279—19.4 10 Claims



1. Hand-held device comprising an axially elongated driven spindle having a leading end and a trailing end, means for securing a working tool on said spindle, said means for securing a working tool comprises an axially extending tubular shaped holder for receiving a working tool with said holder having a leading end and a trailing end with the trailing end thereof connected to the leading end of said spindle, means for releasably connecting said holder to said spindle, at least one first through opening in said holder spaced axially from said releasable connecting means toward the leading end of said holder, a locking element located within said first through opening, means mounted on and displaceable relative to said holder for radially inwardly displacing said locking elements into engagement with a corresponding recess in a working tool inserted into said holder, at least one second through opening in said holder spaced from said first through opening, a control element located within said second through opening and being displaceable between a radially inner position and a radially outer position, said radially inwardly displacing means also arranged for radially inwardly displacing said control element into the radially inner position into a corresponding recess in a working tool inserted into said holder, whereby the radially inner and outer positions of said control member control the displacement of said radially inwardly displacing means relative to said holder.

4,878,680

STROLLER CAR SEAT

Terrence O. Molnar, 35325 Marina, Sterling Heights, Mich. 48077

Filed Jun. 8, 1988, Ser. No. 203,900
Int. Cl.[4] B62B *7/12*
U.S. Cl. 280—30 1 Claim

1. A child stroller car seat apparatus comprising in combination,

a frame including a back rest and a seat, and

a downwardly depending flange directed orthogonally downwardly relative to said seat, and

a perimeter frame underlying and outwardly directed from said flange and fixedly secured to said flange, and

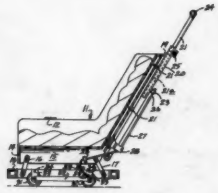
a first and second wheel pair;

each wheel pair pivotally secured to said perimeter frame, and

each wheel pair including a rear and forward wheel;

a reciprocatably mounted handle which is reciprocatably mounted within a pair of tubular supports wherein said tubular supports are fixedly mounted rearwardly of said back seat and including actuator means mounted to each of said rear wheels from said handle, and

said handle positioned rearwardly of said seat and movable from a first retracted position to retract said first and second wheel pairs relative to said perimeter frame, and movable to a second extended position to extend said first and second wheel pairs relative to said perimeter frame wherein said actuator means is operably connected between said handle and said rear wheels to effect said retracted and extended positions of said first and second wheel pairs, and



wherein said actuator means comprises a plurality of flexible cables, a flexible cable connected between each axle of said rear wheels and said handle, and

wherein said handle is of a generally "U" shaped configuration with a pair of parallel spaced downwardly depending legs each telescopingly and slidably received within one of said pair of parallel tubular supports, each of said tubular supports including a slot slidably receiving a clamp with each clamp integrally secured to each downwardly depending leg of said handle and each clamp securing a flexible cable thereto, and

wherein an actuator link is secured between each of said rear and forward wheels, and

wherein each forward and rear wheel includes a support axis and said actuator link is secured to each of said axles, and

wherein each flexible cable is directed through a flexible conduit wherein said conduit is secured to said frame by a plurality of clamps to direct said conduit between each leg of said handle to each of said rear wheels, and further including abutment means secured to the perimeter frame for limiting extension of the first and second wheel pairs in the second position.

4,878,681

STEERING SULKY FOR TOWING VEHICLES

Garry W. Busboom, and Gary L. Rogge, both of Beatrice, Nebr., assignors to Exmark Manufacturing Company, Incorporated, Beatrice, Nebr.

Filed Mar. 24, 1988, Ser. No. 172,491

Int. Cl.[4] B62D *63/00, 13/04*

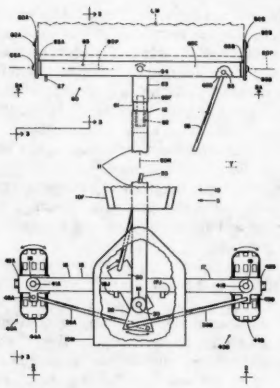
U.S. Cl. 280—32.7 **12 Claims**

1. For use in longitudinally extending attached relationship with a lawnmower towing vehicle, a self steering sulky comprising:

(A) a frame member including a directionally longitudinally extending towbar providing the frame forward portion and said towbar having a front-end and a rear-end, said frame member at the rearward portion comprising a directionally transversely extending and substantially horizontal crossbeam connected to said towbar said crossbeam being provided with transversely separated vertical bores including a left-bore and a right-bore, said frame member being rearwardly provided with a rear-collar defining a vertical central-bore, and said frame member being provided with means for supporting riding personnel thereupon and who may thereat operate the lawnmower towing vehicle;

(B) a pair of wheelmounts extending downwardly from the crossbeam and including a left-wheelmount having a vertical left-stud revolvably journalled by the crossbeam left-bore and also including a right-wheelmount having a vertical right-stud revolvably journalled by the crossbeam right-bore, the lower portion of each wheelmount at a horizontal wheel-axis revolvably supporting a turfengaging wheel means, said left-wheelmount spaced from said left-stud being provided with a horizontally extending left-ear, and said right-wheelmount spaced from said right-stud being provided with a horizontally extending right-ear;

(C) revolvably journalled by said rear-collar centralbore, a vertical central-stud extending downwardly from the frame rear-collar, said central-stud being provided with at least two rigidly radially extending crank means including



a first crank means that extends partially leftwardly and also partially rightwardly of said central-stud;

(D) a pair of links for simultaneously effecting similar directional steering of said wheel means including a left-link having its two end portions pivotably connected to said left-ear and to the rightward portion of said first crank means, and there also being a right-link having its two end portions pivotably connected to said right-ear and to the leftward portion of said first crank means;

(E) attached to the elongate tow bar of the frame member and extending longitudinally forwardly and bi-directionally transversely of the towbar front-end, hitching means for attaching the towing vehicle and the steering sulky, said hitching means providing between the towing vehicle and sulky relative movements along: a vertically extending yaw-axis, a transversely extending pitch-axis, and a longitudinally extending roll-axis;

(F) an elongate steering-rod having its two end portions respectively pivotably connected to the second of said crank means and also to said hitching means at a position transversely offset from said vertically extending yaw-axis, and said steering-rod intersecting an imaginary vertical plane extending longitudinally along said frame towbar; and

(G) anti-jackknife means to limit the extent of revolvability

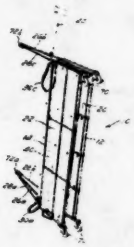
of the left-wheelmount about the frame member left-bore and of the right-wheelmount about the frame member right-bore provided on said cross member.

4,878,682

CENTER COLLAPSIBLE TRANSPORT CART

David M. Lee, 4800 W. McFadden, #93, Santa Ana, Calif. 92704

Filed Jul. 22, 1988, Ser. No. 222,958
Int. Cl.[4] B62B *11/00*
U.S. Cl. 280—42 **6 Claims**



1. A collapsible transport, movable between an "operative" configuration and a "stowed" configuration, said transport cart comprising:

a horizontally disposed pivot member having first and second longitudinally spaced ends, said pivot member being movable up and down in a vertical plane so as to be alternately positionable in a lowered position and a raised position;

first and second rigid vertical members connected to and extending upwardly from said first and second longitudinally spaced ends of said pivot member, said first and second vertical members having upper ends which are sized and configured to be grasped and lifted upwardly to cause said upward movement of said pivot member from its lowered position to its raised position;

first and second rectangular floor panels having inner and outer edges;

first and second side walls having upper and lower edges;

a plurality of rigid transverse end members, each said end member being pivotally attached to and extending between an upper end of one of said first and second vertical members and an upper edge of one of said first and second side walls;

at least one flexible strut member attached to and extending between the approximate upper edge of each of said first and second side walls and the approximate inner edge of each of said first and second floor panels, respectively; and

a plurality of wheels attached to said transport cart and extending beneath said floor panels for supporting said cart on an underlying surface and for maintaining rolling contact with said underlying surface as the cart is moved between its "stowed" and "operative" configurations;

said transport cart, when in its "operative" configuration being disposed such that:

said pivot member is in its lowered position;

said first and second floor panels extend laterally outward from said pivot member in a common horizontal plane so as to form a generally flat cargo floor;

said first and second side walls extend vertically upward from the outer edges of the horizontally disposed floor panels;

said rigid end members extend laterally from each said vertical member to each said side wall so as to support said side walls and to prevent inadvertent pivotal movement of said side walls relative to said floor panels; and

said flexible strut members are fully extended and diagonally taut between each said side wall and each said floor panel so as to support said floor panels in their horizontal operative positions; and

said transport cart, when in its "stowed" configuration, being disposed such that:

said pivot member is in its raised position;

said floor panels extend generally downward from the raised pivot member such that said floor members are disposed in generally vertical, side-by-side planes;

said side walls are positioned outboard of and next to said generally vertically disposed floor panels; and

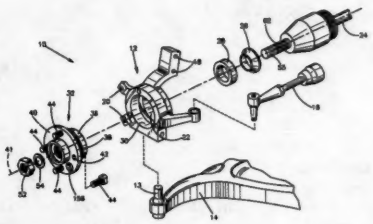
said flexible strut members are relaxed and permitted to hang loosely from their points of affixation to said vertical members and said side walls.

4,878,683

UNITARY HUB ASSEMBLY

James A. Dever, Bay Village, Ohio, assignor to Green Ball Bearing Company, Cleveland, Ohio

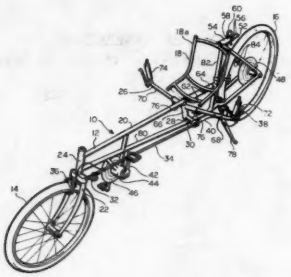
Filed Jul. 26, 1988, Ser. No. 224,343
Int. Cl.[4] B62D *7/18*
U.S. Cl. 280—96.1 **12 Claims**



1. A unitary hub assembly for use in mounting a driven wheel on a steering knuckle of a vehicle, said unitary hub assembly comprising a hub adapted to be connected with a drive shaft and the driven wheel, a bearing assembly to support said hub for rotation relative to the steering knuckle, and a flange connected to said bearing assembly and connectable with the steering knuckle to secure said hub assembly to the steering knuckle, said bearing assembly having a cylindrical housing, said housing having outer side surface means for slidably engaging a cylindrical inner side surface of a recess in the steering knuckle and an end surface for engaging a bottom surface of the recess in the steering knuckle, said bearing assembly having a radially outer and axially inner bearing race fixedly connected to said housing and a radially and axially outer bearing race fixedly connected to said housing and coaxial with said radially outer and axially inner bearing race, said bearing assembly having a first circular array of bearing elements disposed in rolling engagement with said radially outer and axially inner bearing race and a second circular array of bearing elements disposed in rolling engagement with said radially and axially outer bearing race, said bearing assembly having a radially and axially inner bearing race fixedly connected to said hub and disposed in rolling engagement with said first circular array of bearing elements and a radially inner and axially outer bearing race coaxial with said radially and axially inner bearing race and fixedly connected to said hub and disposed in rolling engagement with said second circular array of bearing elements, said flange having axially inner surface means for engaging the steering knuckle at a plurality of locations where said flange is adapted to be secured with the steering knuckle, at least a major portion of said second circular array of bearing elements being disposed between an outer plane containing said axially inner surface means on said flange and an inner plane extending parallel to said outer plane and at least partially containing said end surface of said housing so that said first circular array of bearing elements and at least a major portion of said second circular array of bearing elements

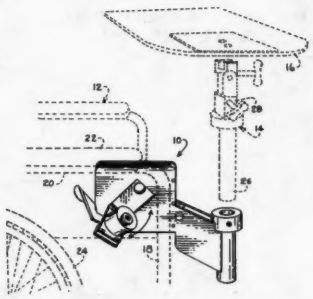
are in the recess in the steering knuckle when said hub assembly is connected with the steering knuckle.

4,878,684
RECUMBENT BICYCLE
Eugene W. Lemie, 3891 Rte. 295, Swanton, Ohio 43558
Filed Dec. 31, 1987, Ser. No. 139,913
Int. Cl.[4] B62K *3/14*
U.S. Cl. 280—288.1 **25 Claims**



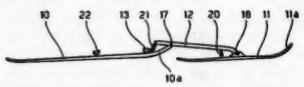
1. A recumbent cycle comprising:
front wheel means;
rear wheel means;
generally horizontally extending frame means extending between said front wheel means and said rear wheel means, said front wheel means being journaled in said frame means for oscillation about a generally vertically extending axis to permit steering of said recumbent cycle, said frame means comprising a generally horizontally extending support bar, a generally horizontally extending tubular member, and means extending from said support bar for supporting said tubular member;
foot supporting means attached to said frame means;
a seat spaced from said foot supporting means and comprising a generally horizontally extending bottom portion and a generally vertically extending backrest portion; said bottom portion being slidably supported on said generally horizontally extending support bar, said backrest portion having a generally horizontally extending rod member extending rearwardly therefrom, said rod member being slidably received in said tubular member;
means cooperative with said rod member and said tubular member for adjusting the position of said seat on said frame means between said front wheel means and said rear wheel means to adjust the spacing between said seat and said foot supporting means;
handle bar steering control means having opposed handles which are graspable by a person in said seat, said handle bar steering control means being spaced from said front wheel means and being journaled with respect to said frame means for oscillation about a generally vertically extending axis, said handle bar steering control means further having a central T-shaped member, said opposed handles being pivotably and detachably secured to opposed ends of a head portion of said T-shaped member, each of said opposed handles extending outwardly and upwardly from said T-shaped member; and
connecting rod means connecting said handle bar steering control means to said front wheel means for transmitting oscillating movement from said handle bar steering control means to said front wheel means.

4,878,685
WHEELCHAIR WORK TRAY
Glenn A. Bahm, Houston, Tex., assignor to Mobility Work Trays, Inc., Houston, Tex.
Filed Sep. 16, 1988, Ser. No. 245,459
Int. Cl.[4] A63D *5/00*
U.S. Cl. 280—304.1 **17 Claims**



1. A wheelchair work tray multipivotal mounting assembly adapted for mounting to a wheelchair or the like, said wheelchair having an armrest assembly including a normally substantially horizontal component and a normally substantially vertical component positioned in converging orientation with respect to said substantially horizontal component, said mounting assembly comprising;
mounting means for mounting over said armrest assembly including a pair of interconnected, spaced apart members adapted to receive said substantially horizontal and said substantially vertical components therebetween, said mounting means including barrier means oriented for simultaneous abutting engagement with both said substantially horizontal component and said substantially vertical component of said armrest assembly;
pivotally mounted, transversely extending, selectively actuatable locking means oriented for abutting said armrest assembly proximate an area of convergence of said substantially vertical and substantially horizontal components and for exerting a clamping force in combination with said barrier means simultaneously on both said substantially horizontal component and said substantially vertical component; and
means for releasably receiving a supporting mount.

4,878,686
DOUBLE-SHOE SKI WITH INTERMEDIATE LINKING MEMBER
Vittorio Quaggiotti, Padova, Italy, assignor to S.B.P. S.r.l., Padova, Italy
Filed Jul. 20, 1987, Ser. No. 75,786
Claims priority, application Italy, Aug. 22, 1986, 41601 A/86
Int. Cl.[4] A63C *5/00*
U.S. Cl. 280—602 **15 Claims**



1. A double-shoe ski comprising:
a rear shoe having an upwardly-curved front end;
a front shoe having an upwardly-curved front end, said front shoe being longitudinally aligned with and shorter in length than said rear shoe;
intermediate link means connecting said rear shoe and said

front shoe and maintaining longitudinal alignment of said front shoe relative to said rear shoe, said link means being hingedly connected to said front shoe to allow pivotal movement of said front shoe only about a side-to-side transverse axis;

foot binding means being mounted on and essentially at the level of said rear shoe, said foot binding means being positioned rearwardly of said intermediate link means; and

motion-limiting means, disposed between said link means and said front shoe, for limiting movement of said front shoe relative to said link means.

4,878,687

SKIBREMSE

Karl Stritzl, Vienna; Franz Luschnig, Traiskirchen; Andreas Riegler, Vienna; Hubert Wurthner, Hainburg/Donau, and Henry Freisinger, Vienna, all of Austria, assignors to TMC Corporation, Switzerland

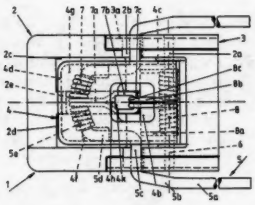
PCT No. PCT/EP87/00262, § 371 Date Jan. 6, 1988, § 102(e) Date Jan. 6, 1988, PCT Pub. No. WO87/07515, PCT Pub. Date Dec. 17, 1987

PCT Filed May 18, 1987, Ser. No. 154,346

Claims priority, application Austria, Jun. 3, 1986, 1483/86

Int. Cl.[4] A63C *7/10*

U.S. Cl. 280—605 **8 Claims**



1. A ski brake (**1**, **10**) comprising:

a bail including first and second brake-arms (**5**, **50**);

an erecting spring (**8**, **80**) positioned to urge said ski brake (**1**, **10**) into a braking position in which said first and second brake-arms (**5**, **50**) are located next to side surfaces of a ski and project below said ski;

an actuation pedal (**4**, **40**), the depression of which causes said ski brake to be positioned in a ready position in which said first and second brake arms (**5**, **50**) are pivoted toward a longitudinal axis of said ski so that said first and second brake-arms (**5**, **50**) do not extend below said ski; and

a connecting spring (**7**, **70**) including a cross rod (**7***c*, **70***c*) supported by said first and second brake arms (**5**, **50**) and positioned in a guide path (**2***e*, **20***e*) of a base plate (**2**, **20**) and against a front limit wall (**4***h*, **40***h*) of a longitudinal passage (**4***b*, **40***b*) of said actuation pedal (**4**, **40**);

wherein said erecting spring (**8**, **80**) comprises first and second legs (**8***a*, **80***a*; **8***b*, **80***b*), said first leg (**8***a*, **80***a*) biasing said actuation pedal (**4**, **40**) toward said braking position and said second leg (**8***b*, **80***b*) biasing said connecting spring (**7**, **70**) toward said braking position.

4,878,688

VEHICLE SUSPENSION SYSTEM FOR A STEERABLE WHEEL

Kanji Kubo, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 17, 1988, Ser. No. 169,438

Claims priority, application Japan, Mar. 20, 1987, 62-067460

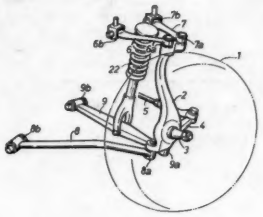
Int. Cl.[4] B60G *3/20*

U.S. Cl. 280—693 **9 Claims**

1. A suspension system for a steerable wheel, comprising a knuckle rotatably supporting a wheel having a tire for rotation about an axle line, two pairs of lateral links, each pair being located one above the other, which are pivotally connected to upper and lower parts of the knuckle at their first ends, respectively, and pivotally connected to a vehicle body at their second ends, so as to allow both a steering action and a vertical motion of the knuckle, wherein:

the lower lateral links comprise a first lower link which extends substantially laterally of the vehicle substantially in parallel with the axle line of the wheel as projected onto the road surface and a second lower link which diverges relative to the first lower link from the knuckle toward the vehicle body forming a certain angle in relation with the first lower link;

the upper lateral links comprise a first upper link which extends in a direction intermediate between those of the



lower links as projected onto a horizontal plane and a second upper link which diverges relative to the first upper link, so as to extend obliquely in opposite direction to the second lower link as projected onto a horizontal plane, from the knuckle toward the vehicle body forming a certain angle in relation with the first upper link; and

the first end of the second upper lateral link being spaced laterally from the first end of the first upper lateral link away from the vehicle body while the first ends of the lower lateral links are substantially aligned along the longitudinal direction of the vehicle and, likewise, the second ends of each pair of the lateral links are substantially aligned to each other along a longitudinal direction of the vehicle.

4,878,689

COVER OF A DRIVER-SIDE GAS BAG COLLISION PROTECTION DEVICE IN MOTOR VEHICLES

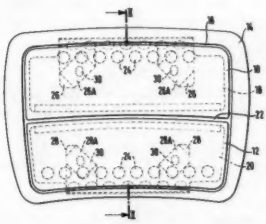
Jürgen Mitzkus, Mutlengen, and Dieter Wiesner, Schwäbisch Gmünd-Lindach, both of Fed. Rep. of Germany, assignors to TRW Repa GmbH, Alfdorf, Fed. Rep. of Germany

Filed Jul. 27, 1988, Ser. No. 224,904

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 8713154[U]

Int. Cl.[4] B60R *21/05, 21/20*

U.S. Cl. 280—731 **5 Claims**



1. A cover of a driver-side gas bag collision protection device accommodated in the steering wheel of a motor vehicle,

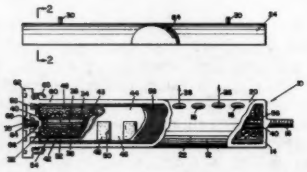
said cover comprising two cover portions, each of said cover portions having an outer edge region permitting the cover portions to fold open, said cover portions being connected together at their center edge region along a tear line by weakened wall portions, each cover portion comprising a reinforcing insert embedded in foamed plastic, said reinforcing insert being formed by a metal plate which extends out of the outer edge region of each cover portion and terminates in lug-like securing portions, said cover including a frame having an inner surface, each cover portion being arched at its outer edge region adjoing said frame, said metal plate being connected to said frame and having a transition portion to said lug-like securing portions comprising: a first portion within said frame, a second portion extending inwardly from said first portion through said inner surface and out of said foamed plastic, and a third portion extending approximately perpendicular to said second portion and along said inner surface of said frame and terminating in said lug-like securing portions.

4,878,690

LIGHT WEIGHT VEHICLE RESTRAINT BAG INFLATOR

Donald J. Cunningham, North Ogden, Utah, assignor to Morton Thiokol, Inc., Chicago, Ill.

Filed Mar. 9, 1988, Ser. No. 166,066
Int. Cl.[4] B60R *21/26*
U.S. Cl. 280—741 **20 Claims**



1. An inflator for a vehicle inflatable restrain bag comprises an elongate generally cylindrical housing having first and second sides and having along said first side gas outlet means, said first side extends over an arc of said housing circumference of less than about 180 degrees, said second side extends over an arc of said housing circumference which is equal to 360 degrees less said arc over which said first side extends, said second side being free of gas outlets, the inflator further comprises an elongate arcuate barrier member which has a thickness which is less than 0.06 inch disposed within said housing and defining a chamber for holding gas generant material, gas generant material disposed within said chamber, means for igniting said gas generant material, gas filtering means disposed between said chamber and said housing, and means for directing generated gas from said chamber in a direction toward said housing second side, said barrier member being disposed between said chamber and said housing first side to prevent the flow of generated gas, as it leaves said chamber, in a direction toward said housing first side whereby generated gas may change direction after it flows out of the chamber toward the housing second side to flow through the filter means while flowing around the barrier member to the gas outlet means.

4,878,691

TRAILER SUSPENSION APPARATUS

Herbert E. Cooper, Scottsdale; Josef P. de Fazekas, Fountain Hills, and E. Dallas Smith, Scottsdale, all of Ariz., assignors to DBX Corporation, Scottsdale, Ariz.

Filed Mar. 23, 1988, Ser. No. 172,695
Int. Cl.[4] B60G *11/26*
U.S. Cl. 280—189 **20 Claims**

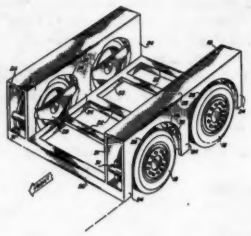
10. A wheel suspension apparatus in which the wheels on opposite sides of a vehicle are independently suspended, comprising:

a U-shaped frame having a transverse structure and upright structures carried at the ends of the transverse structure, said upright structures having downwardly-facing openings thereon;

wheels disposed in the open regions of the upright structures, the upright structures being disposed respectively at least in part above the tracks of said wheels, said wheels having rolling axes and the transverse structure being disposed beneath the rolling axes of said wheels;

a pair of trailing suspension arms having front and rear ends;

pivot means for pivotally supporting each of said arms at its forward end on said upright structure with its rear end being movable vertically between uppermost and lowermost positions, said pivot means being disposed in a region above the track of said wheel;



biasing means for separately biasing each said suspension arm in an intermediate position between the uppermost and lowermost positions, said biasing means being disposed between the rear ends of said arms and said upright structure, said biasing means being disposed in a region above the track of said respective wheel; and

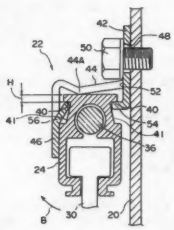
a spindle on each said arm intermediate its ends for rotatably carrying each said wheel.

4,878,692

GUIDE RAIL SUPPORTING STRUCTURE

Takayuki Ando; Kazuyoshi Ishiguro; Kenji Matsui; Tatsuo Yamashita, and Toshikatsu Kondo, all of Aichi, Japan, assignors to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Aichi, Japan

Filed Jul. 26, 1988, Ser. No. 224,396
Claims priority, application Japan, Jul. 27, 1987, 62-114780[U]; Mar. 25, 1988, 63-39464[U]
Int. Cl.[4] B60R *22/06*
U.S. Cl. 280—804 **23 Claims**



1. A structure for supporting a guide rail of an automatic seat belt apparatus of a vehicle on a side wall of a compartment to slidably support and move a slider attached to a webbing in a longitudinal direction of said vehicle front and rearwards along said wall of said compartment for positioning said webbing about an occupant in said vehicle, said structure comprising:

a holder being engageable with sides of said guide rail and being disposed on said side wall in the widthwise direction

of the compartment, said holder having at least one first engagement piece for supporting said guide rail; and

a first engagement portion formed at an outside portion of said guide rail in the widthwise direction of the compartment and formed essentially in the end portion of said guide rail that is remote from said webbing with respect to said slider, said first engagement portion being engageable with said first engagement piece.

4,878,693

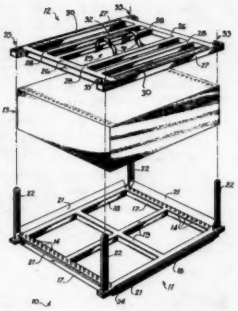
SHEET MATERIAL CARRIER

Peter Scherm, 1508 Glenleaf Dr., Norcross, Ga. 30092

Filed Nov. 16, 1988, Ser. No. 271,927

Int. Cl.[4] B42D *17/00*; B42F *13/00*; F16B *2/20, 21/00*

U.S. Cl. 281—45 **12 Claims**



1. An apparatus for supporting and transporting sheet material of the type having perforated marginal edge portions, said apparatus comprising:

a base member to support the sheet material with said base member defining a plane upon which the sheet material rests;

a plurality of pins mounted to said base member and extending upwardly therefrom with said pins being adapted to register with and extend through the perforated marginal edge portions of sheet material supported upon said base member; and

means for guiding sheet material into position upon said base member with said pins extending through the perforated marginal edge portions of the sheet material, said means comprising at least one guide element mounted to a peripheral portion of said base member and extending upwardly and outwardly therefrom at an angle relative to the plane of said base.

4,878,694

METHOD AND DEVICE FOR THE REMOTE POSITIONING OF AN ELBOW COUPLING

Yvon Castel, Croissy S/Seine, France, assignor to Institut Francais du Petrole, Rueil-Malmaison, France

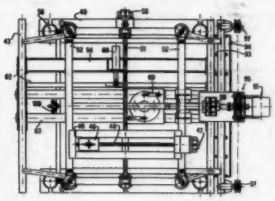
Filed Jun. 25, 1987, Ser. No. 66,204

Claims priority, application France, Jun. 26, 1986, 86 09421

Int. Cl.[4] F16L *35/00*

U.S. Cl. 285—24 **15 Claims**

1. In a device for a remote positioning of an elbow coupling to a distance installation from a main installation situated above the distance installation, said device including a support frame, said elbow coupling having at least two ends at least one of which cooperates with an end of a first line to obtain a connection between these ends, said first line being connected to said distance installation, said support frame including a suspension member for suspending the support frame from a support element connected to the main installation and a support member holding said elbow coupling with said support frame, said members being fixed to said support frame, said support and suspension member being movable relative to said support



frame and along a direction not parallel to a substantially vertical axis of the support element.

4,878,695

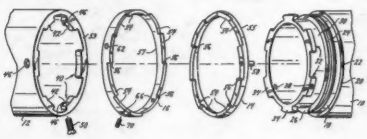
EXPANDING RING JOINT

Kent G. Whitham, Inyokern, Calif., assignor to The United States of America as Represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 5, 1988, Ser. No. 280,056

Int. Cl.[4] F16L *35/00*

U.S. Cl. 285—39 **13 Claims**



1. An apparatus for joining female and male tubular members along a common axis, comprising:

a female tubular member having on one end a flat end surface and a female interrupted lip on said one end defining a plurality of inwardly projecting cogs;

a male tubular member having a male interrupted lip on one end defining a plurality of outwardly projecting cogs sized and positioned to fit between and behind said inwardly projecting cogs when said male tubular member is axially aligned with said female tubular member, said male tubular member also defining a shoulder on said one end, said shoulder having an integral, stepped ramp surface extending axially therearound;

a ring having a flat surface on one side and a stepped ramp surface on the other side, said ring being positioned around said one end of said male tubular member, said step ramp side abutting said stepped ramp surface integral to said shoulder;

said female and male tubular members being axially aligned and engaged wherein said outwardly projecting cogs are behind said inwardly projecting cogs;

means for holding said male tubular member against rotation relative to said female tubular member;

means for rotating said ring relative to said stepped ramp surface integral to said shoulder so that said ring flat surface is in abutment with said flat end surface; and

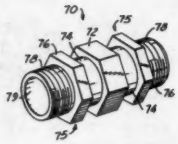
means for locking the rotational position of said ring relative to said male tubular member.

4,878,696

HEXAGONAL JUNCTION ADAPTER FOR CLAMPING SYSTEM

William R. Walker, Rochester, Mich., assignor to Hydro-Craft, Inc., Rochester Hills, Mich.

Filed Oct. 11, 1988, Ser. No. 255,823
Int. Cl.[4] F16L *3/10, 3/22*
U.S. Cl. 285—61 **10 Claims**



1. A junction adapter for a standard plural line clamping assembly of the type having (1) a plurality of channels each of generally U-shaped cross-section and each provided with two leg sections and a connecting section therebetween, and provided with semicylindrical collar portions formed in the leg sections at the outer most extent thereof, and (2) stacking nut means, disposed between and separating said first and second channels in a position such that the U-shapes of the two members face each other, the adapter comprising:

a hexagonal-shaped central support portion adapted to be mounted within the channels of the standard plural line clamping assembly;

two cylindrical collar support portions each formed radially smaller than said central support portion and formed at each axial side thereof and adapted to be mounted between two opposed semi-cylindrical collar portions of a standard plural line clamping assembly;

two connection portions each formed at the end of said collar support portion opposite said central support portion and provided with connector means to sealingly receive a fluid line connection, said connection portions each including at least a first section which is of the same hexagonal shape and size in cross-section as the central support portion, whereby each said section of the connection portion is usable as wrench flats when connecting fluid lines to the adapter,

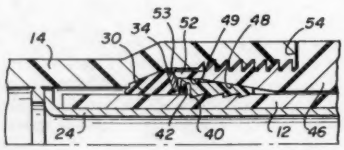
and wherein said central support portion, collar support portions and connection portions are formed from a single piece of hexagonal bar stock material, and have a common fluid passage extending therethrough.

4,878,697

COMPRESSION COUPLING FOR PLASTIC PIPE

Ralph E. Henry, Rixford, Pa., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Oct. 14, 1987, Ser. No. 108,144
Int. Cl.[4] F16L *33/18*
U.S. Cl. 285—250 **9 Claims**



1. A compression coupling for plastic pipe, comprising in combination:

a body having an enlarged bore and a sloped transition surface narrowing to an inner bore, said bores extending along a longitudinal axis of said body and said enlarged bore having internal threads;

a rigid stiffener having a flange at one end thereof with said flange end inserted into said inner bore;

an elastomeric gasket, having an axially outer end, encircling said stiffener and compressible in said body, said gasket having a sloped radially outward surface, and said sloped radially outward surface conforming to said sloped transition surface between said bores of said body;

a flexible spring washer encircling said stiffener for contacting said gasket at its axially outer end;

a grip ring encircling said stiffener and having a frustoconical radially outward surface, a radially inward surface having a plurality of inwardly projecting means for gripping, a lateral slot, and a resilient lip for axially compressive contact with said spring washer; and

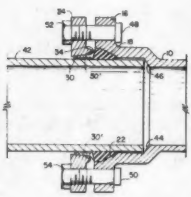
a connecting threaded nut encircling said stiffener and having external threads for engagement with said internal threads of said enlarged bore, said nut having an axially extending nose and a frustoconical bore for mating with said outward surface of said grip ring, said pipe inserted in said bores and around said stiffener, axial movement of said nut as said nut is threaded into said body causing axial movement of said gasket, said spring washer and said grip ring toward the transition surface of the body, resulting in radial compression of said grip ring around said pipe and compression of said gasket by axial force of said nose and said resilient lip against said spring washer, said sloped radially outward surface of said gasket mating with said transition surface of said body forming a seal.

4,878,698

RESTRAINING PIPE JOINT

R. Fowler Gilchrist, 2409 Farington Rd., Witchita Falls, Tex. 76308

Continuation-in-part of Ser. No. 2,322, Jan. 12, 1987, abandoned. This application Oct. 13, 1988, Ser. No. 257,241
Int. Cl.[4] F16L *23/02*
U.S. Cl. 285—342 **4 Claims**



1. A restraining pipe joint for use in a bell and plain pipe end assembly comprising:

a. a plain pipe end of plastic;

b. a bell which defines an opening wall of maximum radius relative to a center line of the joint, said opening wall joining a first conical shoulder of declining radius, a second shoulder of shortest radius, joining the first shoulder rearwardly to form within the bell a recess for the plain pipe end;

c. a gland encircling the plain pipe end, said gland defining a conical axial aperture interior wall which terminates short of its forward end forming in extension thereof an inclined interior peripheral abutment;

d. an elongated split ring likewise encircling the plain pipe end in juxtaposition with said gland and including:

i. a conical exterior wall complementally engageable by the conical axial aperture interior wall of said gland,

ii. a peripheral flange in forward extension of the conical exterior wall, directed outwardly from the plain pipe end, said flange defining at its end a forwardly inclined

outer shoulder of positive angle relative to the center line of the joint and an inner rearwardly inclined inner shoulder of greater positive angle than the outer said shoulder of the flange, the inner shoulder of the flange being contiguously engageable by the inclined, interior peripheral abutment of the gland.

iii. a plurality of inwardly extending pipe end gripping teeth forming the inner surface of said split-ring, and

e. a compressible gasket encircling the plain pipe end, interposed between said split ring flange and the bell, said gasket defining a forwardly inclined packing ring shoulder, engageable in parallel with the forwardly inclined outer shoulder of said split-ring flange and an inwardly inclined outer shoulder, complementally contiguous with the first shoulder of the bell;

f. tightening means interconnecting said gland and the bell compressibly securing said gasket and said split-ring assembly within the pipe joint.

4,878,699

LATCH MECHANISMS

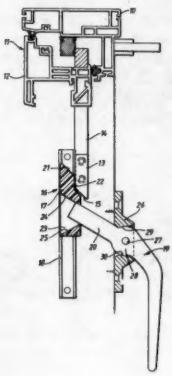
Yurek A. Wronski, Cheltenham, United Kingdom, assignor to Cotswold Architectural Products Limited, Cheltenham, England

Filed Apr. 22, 1988, Ser. No. 184,875

Claims priority, application United Kingdom, May 2, 1987, 8710510

Int. Cl.[4] E05C *1/14*

U.S. Cl. 292—143 **8 Claims**



1. In a window assembly, comprising a frame defining a window opening having an outside and an inside, the window pivotally mounted on the frame for closing the opening by engaging the outside of the frame and a fly screen fixed to the inside of the frame and extending across the opening, a latch mechanism comprising operating means having an operating handle and a tongue movable in response to movement of the handle, means for pivotally mounting the operating means in the window frame such that the operating handle extends inwardly of the frame and the tongue extends outwardly of the frame, a latch member mountable on the outside of the window frame for relative movement thereto and engageable by the tongue for operation by the handle, and a latch element mountable on the window to align with the latch member when the window is substantially closed, the facing ends of the member and element being mutually configured so that when they engage during operational movement of the latch member the element is drawn across the member into a locking position.

4,878,700

CABINET STIFFENER

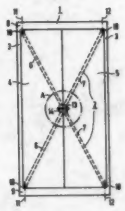
Johannes Brune, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschtaft, Munich, Fed. Rep. of Germany

Filed May 23, 1988, Ser. No. 197,613

Claims priority, application Fed. Rep. of Germany, Jul. 6, 1987, 3722296

Int. Cl.[4] E05C *3/04*

U.S. Cl. 292—241 **8 Claims**



1. A stiffening device for a cabinet having a first and a second angle strut, a frame rack and at least two doors, each angle strut being formed from at least two profile bars coupled to each other to create a vertex enclosing an obtuse angle, each of said angle struts pivoting at their ends in an upper and lower corner region of said frame rack about an axis parallel to a lateral edge of siad frame rack, said angle struts further coupling to each other in a frictional and form-locking manner at their vertex, the improvement comprising:

(a) the first angle strut having a first hole of a first radius R_1 located at the vertex of said first angle strut and the second angle strut having a second hole of a second radius R_2 located at the vertex of said second angle strut, said second radius R_2 being greater than said first radius R_1; and

(b) a tightening assembly associated with the angle struts and acting as an eccentric at their vertex comprising a tightening latch having a first and a second disc coupled to each other, the first disc having a first radius R_1 and pivoting in the first hole having the first radius R_1, the second disc lying in the plane of the second hole when the angle struts are coupled to each other, the second disc further being made of a first circular sector with a second radius R_2 and a second circular sector with a third radius R_3, the center of the first circular sector being located on a straight line perpendicular to said axis through a center of said first hole.

4,878,701

PORTABLE DOOR LOCK

Stephen A. Rondel, Redmond, and James B. Dobson, Seattle, both of Wash., assignors to Advanced Products & Technologies, Redmond, Wash.

Filed Apr. 16, 1987, Ser. No. 39,539

Int. Cl.[4] E05C *19/18*

U.S. Cl. 292—288 **2 Claims**

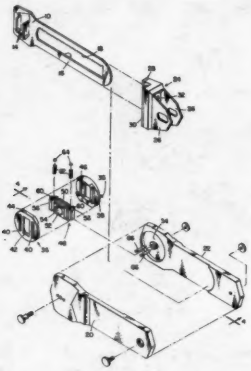
1. A portable device for securing doors or the like comprising:

a blade means including an outer end for fixedly engaging the latch plate of a doorjamb while allowing the door latch to function normally and an inner elongated end having a serrated edge along a substantial portion of its length, being selectively engaged by a retractable dog having a serrated edge, said dog being biased away from said inner elongated end by a spring biased roller means continuously urging the dog to a nonengaging position;

a handle means, rotatably connected to said dog, said handle means moveable along the blade means such that when the handle means and the blade means are parallel, the dog is freely moveable along the inner elongated end of the blade means and when the handle means is at an angle to

the blade means the dog prevents relative movement between the handle means and the blade means; and

a pressure block attached to said handle means, such that



when said blade means engages the latch plate and when said pressure block abuts the door and is held in place by the action of the dog, it securely holds the door in a closed position.

4,878,702

METHOD, A BINDER AND A BINDING MACHINE FOR CLOSING HOSE OR BAG SHAPED PACKINGS, PRIMARILY TUBULAR FOODSTUFF PACKINGS

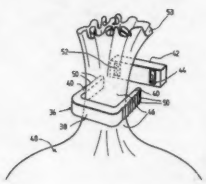
Erik Madsen, Viby J., and Flemming Kroman, Brabrand, both of Denmark, assignors to emc-tamaco a/s, Viby J., Denmark

Filed May 29, 1987, Ser. No. 55,366

Claims priority, application Denmark, May 29, 1986, 2508/86

Int. Cl.[4] B65D *33/34*

U.S. Cl. 292—307 **9 Claims**



1. A method of closing hose or bag shaped packings, primarily foodstuff packings, whereby a constricted portion of the packing is clamped by a ring shaped non-metallic clamp binder caused to be narrowed about the constricted portion of the packing by a closing pressure applied from opposite sides thereof and fixed in its shaped as attained when it is subjected to a final closing pressure, characterized in that the constricted portion of the packing is clamped between opposed smooth surface portions of substantially straight clamping beams of the non-metallic clamp binder so as to be compacted into a final shape, in which the constricted portion of the packing is cross-sectionally oblong in a longitudinal direction of the substantially parallel clamping beams. preferably with a length of at least twice a distance between the clamping beams.

4,878,703

IMPLEMENT FOR DISPOSING OF DUNG OF A PET ANIMAL

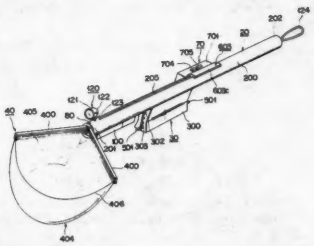
Mashayuki Yoshioka, 3031, 2-chome Higashiyurigaoka, Aso-ku, Kawasaki, Kanagawa, Japan

Filed Aug. 29, 1988, Ser. No. 237,963

Claims priority, application Japan, May 24, 1988, 63-68343[U]

Int. Cl.[4] A01K *29/00*; E01H *1/12*

U.S. Cl. 294—1.5 **33 Claims**



1. An implement for disposing of dung of a pet animal comprising:

tubular means consisting of an elongated tubular body which has first and second ends and a pin removably fitted to said first end in a manner to vertically penetrate said first end;

storage means mounted on said tubular body of said tubular means and for carrying vertically stacked cartridges therein;

movable means movably supported with respect to said storage means and for moving said cartridges within said storage means one by one in a longitudinal bore of said tubular body;

pushing means inserted in said longitudinal bore of said tubular body to be movably supported with respect to said tubular body and for pushing a cartridge having been located in said longitudinal bore of said tubular body by said movable means toward said first end of said tubular body along said longitudinal bore of said tubular body; and

actuating means mounted with respect to said tubular body of said tubular means and for automatically moving said pushing means toward said first end of said tubular body and automatically returning said pushing means toward said second end of said tubular body;

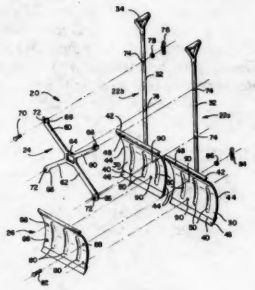
each of said cartridges including a pair of casing members each having a substantially U-shape in vertical section and being pivotally connected at one end thereof to each other in a manner to be faced at an opened side thereof to each other; a vinyl sack having an opening for receiving dung of a pet animal therein and having resilient wire provided along a margin of said opening of said vinyl sack, said vinyl sack being supported through said resilient wire between the faced sides of said casing members in a manner to be folded up; and two tape pieces applied across onto upper and lower surfaces of said casing members to cause said casing members to be closed toward each other against an elastic force of said resilient wire in a manner to permit a space to be left between said casing members, said space being enough to receive said pin of said tubular body therein when said cartridge is moved to said first end of said tubular body by means of said pushing means.

4,878,704

CONVERTIBLE SNOW CLEARING APPARATUS

James M. Jacanin, Jr., 4637 Briarpatch Ct., Fairfax, Va. 22032, and Christopher H. Cardiff, 9020 Southwick St., Fairfax, Va. 22031

Filed Apr. 29, 1988, Ser. No. 187,984
Int. Cl.[4] A01B 1/22; E01H 5/02
U.S. Cl. 294—54.5 18 Claims



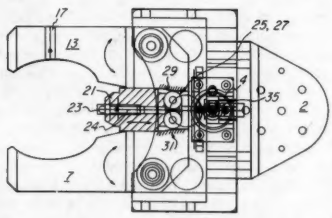
1. Snow clearing apparatus comprising first and second blades for pushing snow, and first means for detachably connecting the first and second blades together in side-to-side relationship to form a wide blade and so as to enable the first and second blades to be detached and separated, the wide blade being substantially rectangular in front profile and having a predetermined transverse width; first and second handles, each handle having one end connected to a respective one of the first and second blades, the handles being transversely spaced such that the predetermined transverse width of the wide blade is greater than the spacing between the handles and such that the wide blade extends transversely beyond each handle; cross bracing means for holding the handles in spaced relationship; second means for detachably connecting the cross bracing means to the handles, and first and second hand grips respectively secured to another end of the first and second handles to enable a user to push the blades across the ground, the first and second detachably connecting means enabling the apparatus to be converted to first and second snow shovels, each shovel comprising one of the blades and one of the handles.

4,878,705

ROBOT GRIPPER PASSIVELY LOCKED

David C. Arnquist, Riviera Beach, Fla., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 18, 1988, Ser. No. 169,690
Int. Cl.[4] B25J 15/02
U.S. Cl. 294—116 7 Claims



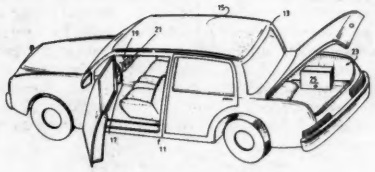
1. A robot gripper comprising:
(a) a set of gripping jaws;
(b) means including a plunger and sensor responsive to predetermined positioning of an object within said jaws to lockingly close said jaws on said object and provide a predetermined sensed pressure condition within said jaws; and
(c) means including a powered latch pin responsive to removal of said predetermined sensed pressure condition and a predetermined further condition to unlock and open said gripping jaws.

4,878,706

ANTI-THEFT SYSTEM

Eduard Novikov, 209 Avenue "P", Apt. C10, Brooklyn, N.Y. 11204

Filed Aug. 25, 1988, Ser. No. 236,537
Int. Cl.[4] B60R 7/00
U.S. Cl. 296—37.1 19 Claims



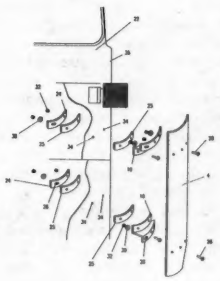
1. An anti-theft system for protecting and preventing theft of valuable accessories for a vehicle comprising, in combination, a vehicle having a frame, a vehicle body supported on said frame, means for operating said vehicle and an instrument panel located in said body, and an accessory removably disposed for use in said vehicle body at one location, and storage means for receiving and storing said accessory, said storage means comprising a parallelepiped container having a cover, including lock means, said container being permanently fixed to said vehicle in the trunk thereof remote from the location where it is used, thereby protecting and preventing theft of said accessory.

4,878,707

AIR DEFLECTOR FOR MAINTAINING CLEANLINESS OF WINDOWS OF A VEHICLE

Arnold G. Meyers, Waterloo, Canada, assignor to Clemmer Industries Limited, Waterloo, Canada

Filed May 31, 1988, Ser. No. 200,469
Claims priority, application Canada, Feb. 8, 1988, 558408
Int. Cl.[4] B60J 1/20
U.S. Cl. 296—91 7 Claims



1. An air deflector for use on a tractor having at least one side window, the purpose of said deflector being to keep the side window clean, said deflector comprising an oblong panel having two ends, a forward edge and a rear edge, said panel

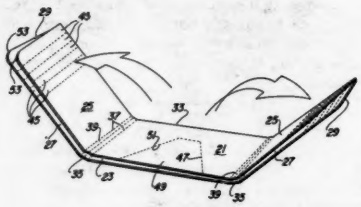
having an arcuate cross section, an interior surface on an inner curve of the arcuate cross section and an exterior surface on an outer curve of the arcuate cross section, with means for mounting said deflector on a front corner of said tractor with said inner surface facing said tractor and a longitudinal centre line of said panel being substantially parallel to a longitudinal centre line of said corner, said corner being the first corner to a front of said side window, said forward edge extending slightly along a front of said tractor and said rear edge extending slightly along a side of said tractor, a flange extending along said rear edge of said deflector, said flange being angled towards said tractor, said panel being held in place by upper and lower brackets between the deflector and the tractor, said brackets continuously decreasing in width from front to rear of said deflector and being curved to correspond to the arcuate cross section of said panel, a space between said panel and said tractor continuously decreasing in size from front to rear of said deflector, an upper end of said deflector being at a level substantially lower than the side window nearest to said deflector, the deflector, when the tractor is moving forward, creating a strong air flow from front to rear of said tractor partially along that side of the tractor where the deflector is located, said air flowing beneath the side window on the same side as the deflector, thereby keeping said window clear from road contaminants for a much longer period of time than would otherwise occur.

4,878,708

MOTOR VEHICLE SUNSHIELD

Dean J. Champane, 7001 Chicago Rd., Warren, Mich. 48092

Filed Nov. 7, 1988, Ser. No. 267,799
Int. Cl.[4] B60J *3/00*
U.S. Cl. 296—97.7 **9 Claims**



1. In a motor vehicle having a windshield, a dashboard and a pair of spaced end pillars:

a collapsible sunshield of a corrugated cardboard resilient material having top and bottom edges and a thickness, including a pair of generally symmetrical planar top and bottom sections of the same height having a single horizontal fold line midway of said top and bottom edges;

each section including non-symmetrical central and end panels of general rectangular shape arranged on transverse laterally spaced parallel fold lines; the panels of both sections being the same height;

the top section having a pair of spaced inner backing panels; and the bottom section having a pair of spaced outer backing panels, a first of said inner backing panels being adjacent a first of said outer backing panels, a second of said inner backing panels being adjacent a second of said outer backing panels, said backing panels being of reduced width with respect to the central and end panels and arranged between said central and end panels on transverse laterally spaced fold lines, the ends of adjacent inner and outer backing panels being in registry;

the sunshield extending closely adjacent and along said windshield substantially over its height and length with the respective end panels at their ends compressively anchored against said pillars and said bottom section being self-supported upon and along said dashboard and extending upwardly to cover a portion of said windshield;

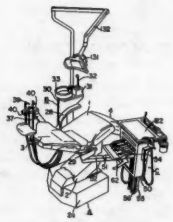
the width of said backing panels being greater than twice the thickness of said sunshield, such that said top and bottom sections can be folded upon said horizontal fold line so as to overlie each other, said adjacent first inner and outer backing panels overlying each other to form one composite backing panel, said second adjacent inner and outer backing panels overlying each other to form a second composite backing panel, one of said end panels being foldable on said transverse fold lines of one of said composite backing panels and received within the width of said other composite backing panel, said other end panel being foldable upon said transverse fold lines of said other composite backing panel to overlie said one end panel.

4,878,709

RETRACTABLE LEGREST FOR DENTAL CHAIR

Kei Okamoto, 816, Kurotani, Osawabe, Yso-Shi, Osaka, Japan

Continuation of Ser. No. 70,089, Jul. 6, 1987. This application Jan. 27, 1988, Ser. No. 148,108
Int. Cl.[4] A47C *7/50*
U.S. Cl. 297—68 **6 Claims**



1. A legrest for a positionable chair having a seat and a legrest extending therefrom, said legrest comprising:

(a) legrest frame means pivotally attached to said seat of said chair proximate a front end thereof;

(b) sub-frame means fixedly coupled to said legrest frame means;

(c) extendable cylinder means pivotally attached at an end thereof to said seat of said chair proximate said front end thereof but more removed from said front end than the pivotal attachment of said legrest frame means to said chair, the other end of said extendable cylinder means attached to said sub-frame means so that when said extendable cylinder means is extended, said sub-frame is moved along with the extendable end of said extendable cylinder means and said legrest frame is moved arcuately about its pivotal attachment to said seat of said chair;

(d) internal frame means positioned between said legrest frame means and said sub-frame means movably connected to said sub-frame means by a rail and guide means and extendable out of its position between said legrest means and said sub-frame means in response to action of a linkage means said linkage means comprising spring means having a first end connected to said legrest means and a second end connected to said internal frame means for urging said internal frame means into a home position, a plurality of pairs of linkage arms forming a dual network linkage system each network pivotally interconnecting said internal frame means and said sub-frame means to each other with one end of each said network connected to said seat of said chair and the other end of each said network connected to said internal frame means, each said network connected to said sub-frame means at a pivot point interum said one end and said other end of the respective network so as to move said internal frame means relative to its position between said legrest and said sub-

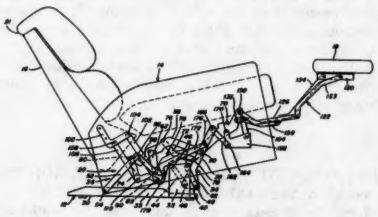
frame means when said extendable cylinder means moves said sub-frame means.

4,878,710

WALL PROXIMITY CHAIR

Billy D. Tacker, Okolona, Miss., assignor to Super Sagless Corporation, Tupelo, Miss.

Filed Jul. 11, 1988, Ser. No. 217,155
Int. Cl.[4] A47C *1/02*
U.S. Cl. 297—68 **12 Claims**



1. A reclining chair having a base, seat and backrest, and a pair of linkage mechanisms for supporting the seat and backrest for movement between upright, TV and reclining positions, each of said linkage mechanisms comprising

a base plate forming part of the base,

a support link,

front and rear pivot linkages pivotally carrying the support link above the base plate, said rear pivot linkage including a pivot link and an additional link connected in series between the base plate and support link,

said front pivot linkage including a pair of substantially parallel swing links pivoted at their upper ends to the base plate and a front pivot link connected at its lower end to the lower ends of the pair of swing links, said front pivot link being connected intermediate its ends to the support link.

a control link connected between the front and rear pivot linkages for preventing collapse of the support link and pivot linkages on the base plate,

a seat mounting bracket carried on the support link by a second pair of swing links, said seat mounting bracket carrying the seat,

and an actuating linkage including a handle mounted on the seat mounting bracket for causing the front and rear pivot linkages to swing the support link forwardly and the seat mounting bracket and seat to the TV position.

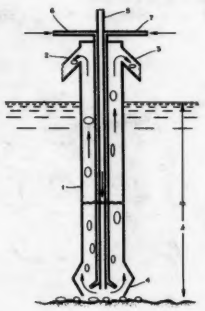
4,878,711

METHOD AND APPARATUS FOR MINING OF OCEAN FLOORS

Bernard Vinot, Paris, and Odile Constant, Chelles, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Feb. 16, 1988, Ser. No. 155,701
Claims priority, application France, Feb. 16, 1987, 87 01913
Int. Cl.[4] E02F *7/00*
U.S. Cl. 299—9 **20 Claims**

1. A process for the mining of ocean floors, comprising arranging a recovery tube so as to extend between an ocean surface and the ocean floor and confining a column of sea water therein, injecting a pressurized gas into said tube, while separately contemporaneously injecting an aqueous solution of at least one water-soluble, high molecular weight suspension enhancing polymer into a base of said tube so as to form a diluted dispersion of particulate ocean floor solids, conveying



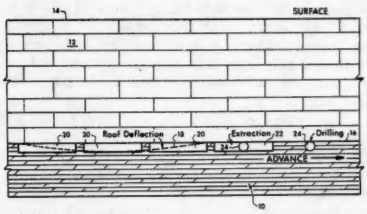
the diluted dispersion towards the ocean surface, and recovering said particulate solids from the diluted dispersion.

4,878,712

HYDRAULIC METHOD OF MINING COAL

Fun-Den Wang, 108 S. Eldridge Way, Golden, Colo. 80401

Filed Sep. 9, 1988, Ser. No. 243,478
Int. Cl.[4] F21C *25/60*; E21C *41/00*
U.S. Cl. 299—10 **22 Claims**



1. A mining method primarily intended for mining coal and other deposits, comprising:

(a) providing an entry adjacent to at least a portion of the deposit to be mined; and

(b) extracting through said entry a substantially horizontal layer of adjacent slices from the deposit by the steps of:

(1) drilling a substantially horizontal borehole from said entry extending the length of the slice to be extracted, and

(2) introducing a water jet into said borehole and extracting said slice of deposit extending laterally from said borehole by means of said water jet,

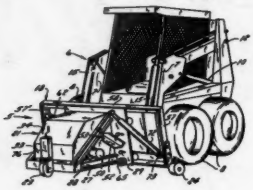
each of said slices extending in a substantially horizontal plane and having an upper and lower surface, the upper and lower surfaces of said slices forming a substantially continuous roof and floor, respectively, above and below said slices, the vertical separation between said surfaces being sufficiently small that elastic downward deformation of said roof due to settling will cause a portion of said roof to contact and be supported by a portion of said floor.

4,878,713

PAVEMENT PLANING MACHINE

C. Christopher Zanetis, Wauwatosa, Wis., assignor to Alitec Corporation, Menomonee Falls, Wis.

Filed Dec. 9, 1988, Ser. No. 282,383
Int. Cl.[4] E01C *23/09*
U.S. Cl. 299—39 7 Claims



1. A pavement planing machine for removable attachment to a self-propelling vehicle such as a front end loader, said vehicle having a pair of lift arms. each outwardly adjacent to one of a pair of opposite sides of the vehicle, said arms being swingable up and down in unison about a laterally extending arm axis near a rear end of the vehicle and projecting forward from that axis to have front ends in front of a front end of the vehicle, attachment means on the front ends of said arms providing for removable attchment of a bucket to said arms and for swinging of the bucket relative to said arms about a bucket axis that is near their front ends and is parallel to said arm axis, and pressure fluid energizable arm actuating means connected with a pressure fluid source on the vehicle for controlledly raising and lowering said arms, said pavement planing machine comprising:

A. a housing that is substantially open at its bottom, said housing having

(1) a top wall,

(2) a pair of opposite uproght sides walls spaced apart by a distance substantially smaller than the distance between said arms,

(3) a laterally extending front member rigidly connected with said side walls at front ends of them, and

(4) a plate-like edgewise upright and laterally extending rear wall

(a) rigidly secured to said side walls at rear ends of them and

(b) having at least one marginal portion which projects edgewise outwardly beyond one of the other of said walls;

B. mounting means on each of said side walls for removably supporting a digging instrumentality that is rotatable in the housing, said mounting means defining a rotation axis substantially normal to said side walls about which said instrumentality is rotatable and whic is fixed in relation to said housing to partake of all motion thereof;

C. an upright frame member removably securabel to said attachment means to replace said bucket and to be swingable about said bucket axis, said frame member having laterally opposite ends and having a width between those ends to extend laterally across the entire distance between said arms;

D. a carrier confined between said frame member and said rear wall;

E. cooperating guide means on said frame member and on said carrier confining the latter to lateral motion relative to the frame member between an off-center position near one of said ends of the frame member and a central position intermediate said ends of the frame member;

F. cooperating pivot means on said carrier and on said rear wall of the housing confining the housing to tilting adjustment relative to the carrier about a fore-and-aft extending tilting axis which is at a level below said rotation axis and is adjacent to the side wall of the housing that is remote from said one end of the frame member;

G. cooperating releasable clamping means on said carrier and on said marginal portion of the rear wall for releasably confining the housing against tilting relative to the carrier and thus maintaining the rotation axis in a selected position of inclination to the horizontal; and

H. pressure fluid actuated expansible and retractable jack means

(1) connectable with said pressure fluid source,

(2) having at one end thereof a connection with said frame member that is near the other of its said ends and near the level of said pivot connection and

(3) having at an opposite end thereof a conneciton with said housing that is at a level substantially above said rotation axis and is adjacent to said side wall that is remote from said one end of the frame member,

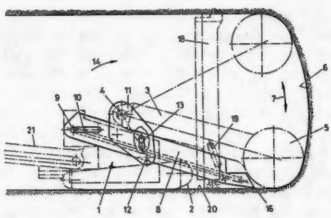
so taht said jack means can effect lateral shifting of the carrier relative to the frame member and can control tilting of the housing relative to the carrier.

4,878,714

CUTTING MACHINE FOR CUTTING AND CARRYING AWAY MATERIAL FROM A WORK FACE

Franz Bärnthaler, Weissenkirchen, and Krzysztof Rutkowski, Vienna, both of Austria, assignors to Voest-Alpine Aktiengesellschaft, Linz, Austria

PCT No. PCT/AT87/00072, § 371 Date Aug. 22, 1988, § 102(e) Date Aug. 22, 1988, PCT Pub. No. WO88/03985, PCT Pub. Date Jun. 2, 1988
PCT Filed Nov. 26, 1987, Ser. No. 251,707
Claims priority, application Austria, Nov. 26, 1986, 3162/86
Int. Cl.[4] F21D *9/10, 9/12*
U.S. Cl. 299—67 5 Claims



1. A cutting machine for cutting and carrying away material from a work face, comprising:

a machine frame and means for supporting the machine frame on a floor in front of a work face;

a longitudinally extending cutting arm having a forward end supporting for rotation at least one cutting head or drum;

means mounting said cutting arm, rearwardly of said forward end thereof, to said machine frame for pivoting about a first transverse axis, for raising and lowering said cutting head or drum relative to said first transverse axis;

a longitudinally extending loading ramp or conveyor having a front edge positionable near the work face for receiving and transporting away from the work face material cut from the work face by operation of the cutting head or drum;

means mounting the loading ramp or conveyor to the machine frame for displacement in a longitudinal direction towards and away from the work face;

said means mounting said cutting arm to said machine frame providing for adjustment of position of said first transverse axis longitudinally towards and away from the work face;

means coupling said loading ramp or conveyor to said means for mounting said cutting arm to said machine frame for

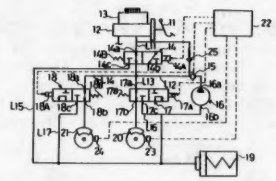
consequential movement therewith, so that as said cutting head or drum is moved towards and away from the work face relative to the machine frame, the front edge of the loading ramp or conveyor is moved towards and away from the work face.

4,878,715

BRAKE CONTROL DEVICE FOR VEHICLES

Hiroshi Toda, Kariya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Sep. 13, 1988, Ser. No. 243,846
Claims priority, application Japan, Sep. 17, 1987, 62-231134
Int. Cl.[4] B60T *8/48*
U.S. Cl. 303—110 **6 Claims**



1. A brake control device for a vehicle wheel, comprising:
a pedal-actuated master cylinder having an outlet,
a wheel cylinder for braking the vehicle wheel,
first valve means having an outlet, and an inlet communicating with said master cylinder outlet, and an outlet,
first fluid conduit means extending from said first valve means to said wheel cylinder,
a fluid pump having an inlet and an outlet,
second fluid conduit means extending from said first valve means to said pump inlet,
second valve means disposed in said first fluid conduit means and having an inlet and an outlet, said pump outlet communicating with said inlet of said second valve means,
shifting means for shifting said first valve means between: (a) an anti-skid braking position in which said outlet of said first valve means communicates with said inlet of said second valve means through said first fluid conduit means, and (b) a traction control position in which said outlet of said first valve means communicates with said pump inlet through said second fluid conduit means, and for shifting said second valve means between (c) a pressure-applying position in which said inlet of said second valve means communicates with said wheel cylinder, and (d) a pressure-relieving position in which said wheel cylinder communicates with said pump inlet,
relief conduit means for conducting fluid from said pump outlet to said master cylinder when a pump outlet pressure exceeds a master cylinder pressure by a predetermined value,
sensing means for sensing skidding and slipping conditions of the vehicle wheel, and control means operably connected to said sensing means for causing said second valve means to be selectively shifted between said pressure-applying and pressure-relieving positions in response to sensed skidding conditions of the vehicle wheel, and for causing said first valve means to be shifted between said anti-skid braking position and said traction control position in response to sensed slipping conditions of the vehicle wheel.

4,878,716

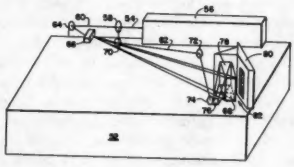
Patent Not Issued For This Number

4,878,717

APPARATUS AND METHOD FOR RAPIDLY CONSTRUCTING HOLOGRAMS

Hendrik J. Gerritsen, Providence, R.I., assignor to Brown University Research Foundation, Providence, R.I.

Filed Nov. 19, 1987, Ser. No. 122,373
Int. Cl.[4] G03H *1/08, 1/30*
U.S. Cl. 350—3.66 **20 Claims**



1. An apparatus for constructing a multiplex hologram of two-dimensional images, comprising:
a variable-reflectance device whose reflectance varies in a series of patterns representative of a series of two-dimensional images;
a holographic plate to be exposed;
means for directing an object beam of coherent radiation at said variable-reflectance device to be redirected by said device to said holographic plate;
means for directing a reference beam of coherent radiation at said holographic plate to produce, in combination with

said redirected object beam, a holographic interference pattern on said plate; and

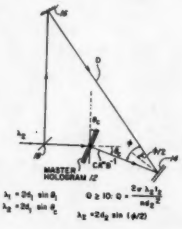
mask means for selectively exposing successive portions of said plate corresponding to successive ones of said images to form a multiplex hologram on said plate.

4,878,718

METHOD FOR HOLOGRAPHIC CORRECTION OF BEAMS OF COHERENT LIGHT

C. Gilbreath-Frandsen, Washington, D.C., and James W. Wagner, Annapolis, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 5, 1986, Ser. No. 938,314
Int. Cl.[4] G02B 5/32
U.S. Cl. 350—3.69 14 Claims



11. A product produced by a method for forming holograms, said method comprising steps for:

directing first and second mutually coherent beams of light of wavelength λ_1 onto a first holographic emulsion at an angle θ_1 measured in opposite directions, respectively, from the normal to said first holographic emulsion, said directing being effective to create an interference pattern of line spacing d_1 on said first holographic emulsion, said λ_1 being defined by: $\lambda_1=2d_1\text{Sin}(\theta_1)$;

developing said first holographic emulsion effective to cause said first interference pattern to be fixed in said first holographic emulsion as a first developed hologram corresponding to said first interference pattern;

directing a third beam of light having wavelength λ_2 onto said developed hologram at a Bragg angle θ_c effective to cause said first developed hologram to diffract said third beam of light, said θ_c being defined by: $\lambda_2=2d_1\text{Sin}(\theta_c)$;

directing the diffracted third beam and a fourth beam of light coherent with said third beam onto a second holographic emulsion at an angle $(\phi/2)$ measured in opposite directions, respectively, from the normal to the second holographic emulsion, said directing of said diffracted third beam being effective to create a second interference pattern of line spacing d_2 on said second holographic emulsion, said first holographic emulsion being selected to be more sensitive to said λ_1 than said λ_2, said second holographic emulsion being selected to be more sensitive to said λ_2 and λ_1, said $\phi/2$ being constrained to satisfy both:

$$\lambda_2=2d_2 \text{ Sin } (\phi/2) \text{ and}$$

$$10\geqq(2\pi\lambda_2 t)/(nd_2^2)$$

said t being the thickness of said second holographic emulsion; and

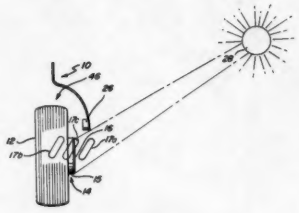
developing said second holographic emulsion effective to cause said second interference pattern to be fixed in said second holographic emulsion as a second developed hologram corresponding to said interference pattern, said second developed hologram being said product.

4,878,719

AUTOMOTIVE WHEEL COVERS WITH SPATIALLY STABILIZED IMAGES

John E. Wreede, Monrovia; James E. Scott, Los Angeles, and Richard B. Upper, Studio City, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 15, 1988, Ser. No. 285,458
Int. Cl.[4] G03H 1/26
U.S. Cl. 350—3.75 19 Claims



1. In a vehicle, an improved wheel system that provides an emblem image relative to a rotating wheel, the improvement comprising:

a wheel cover member fixed on and rotatable with the rotating wheel; and

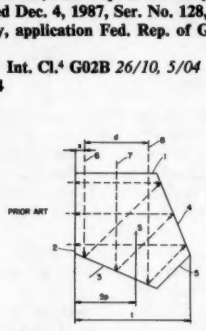
a hologram assembly fixed to said wheel cover member so that said hologram assembly may be exposed to sunlight, said hologram assembly having a plurality of exposures therein, each of which is subject to being selectively used to produce one of a plurality of emblem images of said exposures, said emblem images capable of being remotely positioned from and stationary relative to said vehicle.

4,878,720

DEVICE FOR DEFLECTING A BUNDLE OF LIGHT RAYS

Peter Hanke, Eichenau, and Wie Postanschrift, Munich, both of Fed. Rep. of Germany, assignors to Optische Werke G. Rodenstock, Munich, Fed. Rep. of Germany

Filed Dec. 4, 1987, Ser. No. 128,868
Claims priority, application Fed. Rep. of Germany, Mar. 5, 1987, 3707023
Int. Cl.[4] G02B 26/10, 5/04
U.S. Cl. 350—6.4 20 Claims



1. In a light scanner system including a rotating device for deviating a light beam of a bundle of light rays into a plane, the rotating device comprising a deflecting prism of constant deviation rotatable about an axis, the improvement comprising the deflecting prism being a Wollaston type quadrangular prism having two prism faces forming a right angle therebetween and having an axis of rotation oriented substantially perpendicular to one of the two prism faces having the right angle therebetween, the quadrangular prism having a center of gravity substantially close to the axis of rotation thereof, wherein the quadrangular prism enables rotation at high speed without expensive balancing as necessitated when a pentaprism

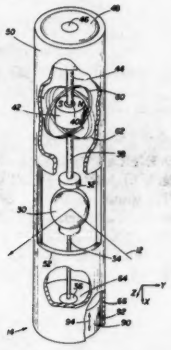
is utilized, the quadrangular prism having the center of gravity closer to the axis of rotation thereof than the distance between the center of gravity and the axis of rotation of a pentaprism.

4,878,721

RESONANT MECHANICAL SYSTEM

Dean R. Paulsen, Danvers, Mass., assignor to General Scanning, Inc., Watertown, Mass.

Filed Feb. 17, 1987, Ser. No. 14,998
Int. Cl.[4] G02B *26/10*
U.S. Cl. 350—6.6 **21 Claims**



2. A resonant rotationally oscillating mechanical system comprising

an even number of masses supported at spaced apart locations along a resilient structure held at both ends on a stationary base to define a natural resonance frequency of intended rotational motion about an axis relative to said base,

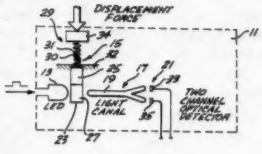
said resilient structure, for a selected mode of motion, being stiff so as to substantially preclude angular motion of one of said masses relative to said base about an axis other than said axis of said intended rotational motion.

4,878,722

WAVELENGTH ENCODED OPTICAL SWITCHES

Leonard Y. Nelson; John R. Green, and Carol W. Wong, all of Seattle, Wash., assignors to Korry Electronics Company, Seattle, Wash.

Filed Jun. 24, 1988, Ser. No. 211,437
Int. Cl.[4] G02B *6/36*
U.S. Cl. 350—96.2 **50 Claims**



26. A wavelength encoded optical switch system comprising:

(A) a plurality of switch stations, each of said switch stations comprising:

(1) a light source for generating a beam of light energy;

(2) a movable element located in the beam of light produced by said light source, said movable element including at least two sections, at least one of said two sections comprising a filter having a dissimilar transmissivity effect on light produced by said light source in two different wavelength bands lying within the wavelength band of light produced by said light source; and

(3) positioning means for selectively positioning one or the other of said two sections of said movable element in the beam of light produced by said light source;

(B) pulse generating means for generating a plurality of trigger pulses and selectively applying said trigger pulses to said light sources of said switch stations such that only one of said light sources receives a trigger pulse at one same point in time;

(C) a two-channel photodetector including two light detectors configured to detect light in the two different wavelength bands lying within the wavelength band of light produced by said light source; and,

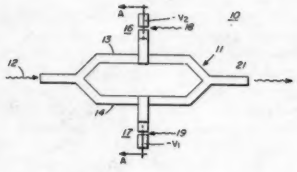
(D) optical coupling means for conveying light from the side of said removable element remote from said light source to said two-channel detector.

4,878,723

OPTICALLY CONTROLLED SEMICONDUCTOR WAVEGUIDE INTERFEROMETER APPARATUS

Ying C. Chen, Closter, N.J.; Jia-ming Liu, Arlington, and Michael A. Newkirk, Auburndale, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Feb. 6, 1986, Ser. No. 826,644
Int. Cl.[4] G02B *6/10*; H01J *40/14*; G01B *9/02*; H01L *27/14*
U.S. Cl. 350—96.14 **14 Claims**



1. An optically controlled semiconductor waveguide interferometer apparatus comprising

a Mach-Zehnder interferometer formed of semiconductor laser materials selected from the group consisting of double heterostructure and quantum-well semiconductor laser materials,

said interferometer having a carrier input port and a carrier output port, and having two optical paths coupling said ports together for dividing an applied input optical signal to said input port and then recombining the divided input signal after passing through the two optical paths and providing the recombined signal onto said output port;

first optoelectronic switching means adapted to be coupled across a first voltage potential and one of said optical paths, said first optoelectronic switching means having a gap therein; and

means for applying a first light pulse to said gap for controlling the index of refraction of said one optical path,

whereby

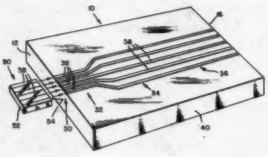
said first light pulse controls said interferometer so that the output intensity of said interferometer is maximized.

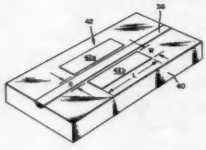
4,878,724

ELECTROOPTICALLY TUNABLE PHASE-LOCKED LASER ARRAY

Suwat Thaniyavarn, Bellevue, Wash., assignor to TRW Inc., Redondo Beach, Calif.

Filed Jul. 30, 1987, Ser. No. 79,552
Int. Cl.[4] G02B 6/10
U.S. Cl. 350—96.14 7 Claims





1. A waveguide structure for controlling the characteristics of the optical outputs of a semiconductor laser array having multiple laser elements coupled to the waveguide structure, comprising:

a first plurality of substantially parallel waveguides formed in an electrooptical material, the waveguides being optically coupled along their lengths;

a plurality of electrodes formed adjacent to the first plurality of waveguides for inducing changes in the degree of optical coupling between the waveguides to provide control of the relate amplitudes of the optical outputs of the laser elements;

a second plurality of substantially parallel waveguides formed in the electrooptical material and optically coupled to the first plurality of waveguides, the second plurality of waveguides being optically uncoupled along their lengths; and

a plurality of electrodes formed adjacent to the second plurality of waveguides for inducing changes in the relative phases of the optical outputs of the laser elements;

whereby both the amplitude and phase of the optical outputs of the laser elements are controlled to produce a desired optical output from the waveguide structure.

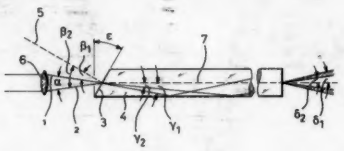
4,878,725

APPARATUS FOR THE CIRCUMFERENTIAL IRRADIATION OF OBJECTS

Stefan Hessel, and Thomas Ischinger, both of Munich, Fed. Rep. of Germany, assignors to Messerschmitt-Bölkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Filed May 24, 1988, Ser. No. 198,453
Claims priority, application Fed. Rep. of Germany, May 25, 1987, 3717525
Int. Cl.[4] G02B 6/32
U.S. Cl. 350—96.15 11 Claims

1. Apparatus for the circumferential irradiation of objects, especially of vessels, hollow organs and solid tissue by high-intensity optical radiation which is conducted to the irradiation site by a flexible optical fiber having a near end and a distant end, wherein the optical radiation comprises two marginal rays in a cross section defining an illuminated line, the radiation being coupled into an end face of the near end of the optical fiber at a predetermined angle (β_1, β_2) to the surface normal of the end face of the optical fiber such that the optical radiation emanates at the distant end of the optical fiber in the form of a conical surface, said predetermined angle β_1 comprising the angle of a first of said marginal rays with respect to the surface normal and said predetermined angle β_2 comprising the angle



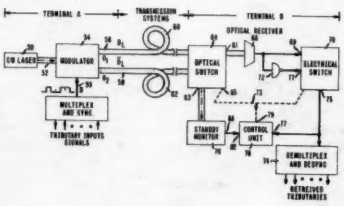
of a second of said marginal rays with respect to the surface normal, said predetermined angles β_1 and β_2 each being greater than 0°.

4,878,726

OPTICAL TRANSMISSION SYSTEM

Mohammad T. Fatehi, Middletown, N.J., assignor to American Telephone and Telegraph Company, New York, N.Y. and AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 10, 1988, Ser. No. 269,289
Int. Cl.[4] G02B 6/26
U.S. Cl. 350—96.15 6 Claims



1. An optical network

comprising

a laser for generating optical energy,

a directional coupler modulator having a control port coupled to simultaneously transmit optical signals to a first output port and the complement of said optical signal to a second output port,

a first transmission network coupled to receive the optical energy from said first port,

a second transmission network coupled to receive the complementary optical energy from said second port,

an optical receiver for converting received optical signals to electrical signals,

an optical switch coupled to said first and second transmission networks to pass only the optical signal on said first transmission network to said optical receiver, and

control means coupled to selectively activate said optical switch to pass only the optical signal on said second transmission network to said optical receiver.

4,878,727

MULTIMODE CHANNEL WAVEGUIDE OPTICAL COUPLING DEVICES AND METHODS

Anthony A. Boiarski, Upper Arlington, and William M. Myers, Grandview Heights, both of Ohio, assignors to Battelle Memorial Institute, Columbus, Ohio

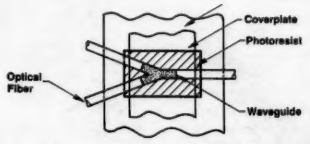
Filed Jun. 30, 1988, Ser. No. 213,657
Int. Cl.[4] G02B 6/30
U.S. Cl. 350—96.17 14 Claims

1. A method of fabricating a device for optical coupling

between multimode fiber optic means via multimode channel waveguide means comprising

providing a substrate having a predetermined relatively lower index of refraction with a substantially planar surface and an elongate open channel therein,

filling a predetermined middle portion of the channel with an optically conductive waveguide material in a liquid state and having a predetermined relatively higher index of refraction,



then hardening a middle portion of the waveguide material, placing a fiber optic means in each end of the channel adjacent to each end of the waveguide material with an end of each fiber optic means contacting the adjacent end of the waveguide material, and then

hardening the rest of the waveguide material to form a continuous waveguide means having a predetermined relatively higher index of refraction and to attach each end thereof to the adjacent end of one said fiber optic means.

4,878,728

MULTILAYER INTEGRATED OPTICAL DEVICE

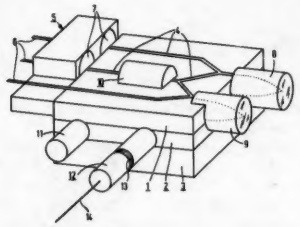
Lothar P. Mannschke, Eckental-Eckenhaid, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 681,162, Dec. 13, 1984, abandoned. This application May 23, 1988, Ser. No. 198,700

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1983, 3345715; Dec. 17, 1983, 3345716

Int. Cl.[4] G02B *6/30*

U.S. Cl. 350—96.17 **15 Claims**



1. A multilayer integrated optical device comprising:

a substrate;

a first optical waveguide arranged on or in the substrate, said first waveguide extending in at least two directions substantially in a first plane, said first waveguide having an end face;

a second optical waveguide arranged on or in the substrate, said second waveguide extending substantially in a second plane, said second plane being spaced from but substantially parallel to the first plane, said second waveguide having an end face arranged substantially above or below the end face of the first waveguide; and

means for imaging the end face of the first optical waveguide and the end face of the second optical waveguide onto each other, said means being arranged at least partly outside the substrate.

4,878,729

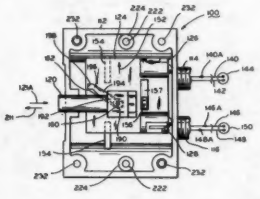
OPTICAL SWITCH

David G. Stewart, Livingstone, South Africa, assignor to Square D Company, Palatine, Ill.

Filed Oct. 28, 1985, Ser. No. 791,802

Int. Cl.[4] G02B *6/32*

U.S. Cl. 350—96.18 **5 Claims**



1. an optical switch comprising:

a housing;

at least one mirror mounted within said housing;

a drive rod, said at least one mirror mounted upon said drive rod, said drive rod capable of linear motion so that in at least one position of said drive rod said at least one mirror is capable of reflecting light in a desired direction; and

means for attaching both a first optical fiber and a second optical fiber to said housing so that at least some of the light entering said housing from said first optical fiber may be reflected from said mirror and travel in said second optical fiber in at one position of said mirror, and said mirror may be moved to reduce the intensity of said light reflected into said second optical fiber.

4,878,730

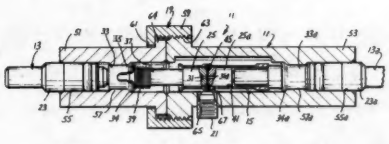
FIBER OPTIC ATTENUATOR

Stephen W. Wall, Costa Mesa, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 31, 1988, Ser. No. 264,426

Int. Cl.[4] G02B *6/38*

U.S. Cl. 350—96.21 **9 Claims**



1. A fiber optic attenuator comprising:

first and second fiber optic termini, each of said termini including a body with an end face and an optical fiber carried by the body, each of the optical fibers having a distal end adjacent the end face;

connector means for connecting the fiber optic termini with the end faces in confronting relationship and the distal ends of the optical fibers optically coupled so that an optical signal can be transmitted from one of the termini to the other; and

means for relatively displacing said distal ends in a generally radial direction from a first optically coupled position to a second optically coupled position, to introduce radial misalignment to the optical fibers and attenuate the optical signal,

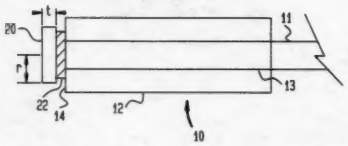
said connector means including resilient means for urging the distal ends from the second optically coupled position toward the first optically coupled position whereby, when the displacing action of the displacing means is removed, the resilient means urges the distal ends toward the first optically coupled position.

4,878,731

FIBER OPTIC CONNECTOR INCLUDING FERRULE WITH FILTER ISOLATOR

Bernard G. Caron, Harrisburg; Pamela R. Gutterman, Camp Hill, and Dale D. Murray, Mount Joy, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Feb. 19, 1988, Ser. No. 146,447
Int. Cl.[4] G02B *6/38*
U.S. Cl. 350—96.21 **2 Claims**



2. In combination,

an optical fiber for conducting optical radiation, said optical fiber defining a longitudinal axis and an exit facet via which radiation leaves the fiber, said exit facet being oriented perpendicular to said longitudinal axis, and

a connector for terminating said optical fiber, said connector comprising a ferrule including a bore for receiving the optical fiber and an end face oriented perpendicular to said longitudinal axis of said fiber, said fiber being received in the bore of said ferrule so that said end face of said ferrule and said exit facet of said fiber are substantially co-planar,

said connector further including a sheet of material capable of transmitting optical radiation in a particular wavelength band, said sheet having an area larger than the area of the exit facet of said fiber, and

sealing means for sealing said sheet to the end face of said ferrule in an orientation parallel to said end face for filtering radiation exiting said fiber via said exit facet to provide said connector with an improved coupling ratio versus wavelength characteristic.

4,878,732

OPTICAL COMMUNICATION CABLE WITH RIBBON WAVEGUIDE SUPPORT

Peter Rohner, Isernhagen, and Gerhard Ziemek, Langenhagen, both of Fed. Rep. of Germany, assignors to kabelmetal electro Gesellschaft mit beschränkter Haftung, Hanover, Fed. Rep. of Germany

Filed Mar. 11, 1987, Ser. No. 24,739
Claims priority, application Fed. Rep. of Germany, Mar. 11, 1986, 367970; Dec. 22, 1986, 3643886
Int. Cl.[4] G02B *6/44*
U.S. Cl. 350—96.23 **21 Claims**

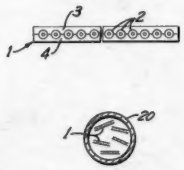
13. A communication cable comprising:

a jacket of high tensile strength;

a core surrounded by the jacket, there being disposed in the core at least one ribbon line comprising two ribbon-shaped supports, there being optical waveguides fixed in place extending parallel to each other between the two ribbon-shaped supports;

wherein, to produce a flexible and easy treatable ribbon line of high tensile strength, the optical waveguides are laminated between the two ribbon-shaped supports of said at least one ribbon line, the ribbon-shaped supports being made of plastic which is reinforced with fiberglass, and the ribbon-shaped supports having a coefficient of thermal expansion essentially equal to that of the optical waveguides; and

the optical waveguides are spaced apart from each other defining intermediate spaces between the optical waveguides, the ribbon-shaped supports each being provided



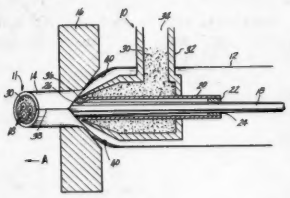
on one side with an adhesive layer and being bonded both to the optical waveguides and to each other at the edges and in the intermediate spaces of a ribbon line, the adhesive and the plastic providing sufficient flexibility to said ribbon line to permit a longitudianal flexing of the ribbon line.

4,878,733

OPTICAL FIBER COMMUNICATION CABLE HAVING A HIGH STRENGTH, DRAWN COPPER ALLOY TUBE

Joseph Winter, New Haven, and Michael J. Pryor, Woodbridge, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed May 24, 1983, Ser. No. 497,546
Int. Cl.[4] G02B *6/44*
U.S. Cl. 350—96.23 **13 Claims**



1. An optical fiber communication cable comprising:

at least one optical fiber;

a high strength drawn copper alloy tube surrounding said optical fiber, said tube having its interior free of any structural reinforcing member and a tube defining wall of a desired substantially constant thickness;

said tube wall including a generally longitudinally extending seam; and

said seam being defined by opposing substantially nonlinear deformed edges whose length from the outside of said tube to the inside of said tube exceeds the thickness of said wall.

4,878,734

BICYCLE WHEEL ACTIVATED REFLECTOR

Ralph J. Trebnick, P.O. Box 23, Bovey, Minn. 55709

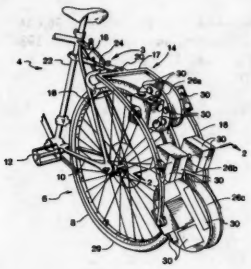
Filed Jun. 22, 1988, Ser. No. 210,091
Int. Cl.[4] G02B *5/12*
U.S. Cl. 350—99 **7 Claims**

1. A reflector apparatus for a bicycle comprising

a bracket secured by a shaft to a frame of the bicycle adjoining the periphery of a rear wheel thereof;

means pivotally connecting the bracket to the shaft, such that the axis of the pivotal connecting means is substantially parallel to the rear wheel transverse support axis of rotation;

at least a first drive wheel means axially supported by the bracket and operatively engaging the rear wheel periph-



ery for rotation therewith, the drive wheel means having an axis of rotation located rearwardly of the rear wheel axis of rotation;

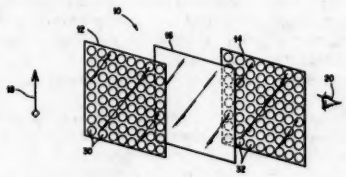
at least one reflecting means operatively connected to the first drive wheel means and rotatable therewith, the reflecting means rotatingly reflecting incident light away from the bicycle.

4,878,735

OPTICAL IMAGING SYSTEM USING LENTICULAR TONE-PLATE ELEMENTS

Ivars J. Vilums, DeForest, Wis., assignor to LookingGlass Technology, Inc., Madison, Wis.

Filed Jan. 15, 1988, Ser. No. 144,942
Int. Cl.[4] G02B *27/22, 27/44*
U.S. Cl. 350—131 **52 Claims**



1. An optical imaging system for storing, processing and reconstructing an image of an object, comprising:

(a) a generation plane, which encodes information concerning the object into the system, the generation plane including a plurality of first diffraction elements, each of which represents a separate optical element; and

(b) a presentation plane, which decodes the information encoded by the generation plane, the presentation plane including a plurality of second diffraction elements defining a planar array of first circular zone plates;

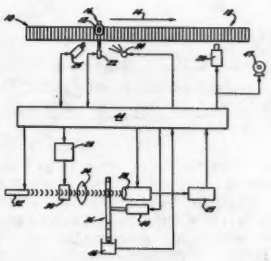
wherein the generation plane and the presentation plane are separated by a substantially transparent medium having a thickness of at least the sum of the focal lengths of the generation plane and the presentation plane, wherein the substantially transparent medium comprises a resource plane at the focal lengths of the generation plane and the presentation plane.

4,878,736

CONTROL MEANS AND METHOD FOR OPTICAL INSPECTION SYSTEM

Roeland M. T. Hekker, and Izhak M. Livny, both of Fairfield, Iowa, assignors to Global Holonetics Corporation, Fairfield, Iowa

Continuation-in-part of Ser. No. 920,513, Oct. 17, 1986. This application Dec. 23, 1987, Ser. No. 137,464
Int. Cl.[4] G02B *27/46*; G01N *21/01*
U.S. Cl. 350—162.13 **29 Claims**



1. An object inspection system, comprising:

first imaging means for generating electrical signal data representative of the appearance of each inspected object;

second imaging means for receiving said signal data and generating a visual image of the object;

third imaging means for receiving and generating a transform image from said visual image of the object;

signature generating means for sampling light from different spatial domains of said transform image and generating electrical signal data representative thereof and collectively defining a characteristic signature of said transform image and thus of the inspected object;

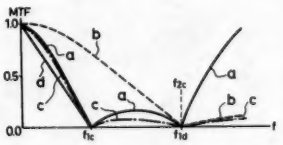
and control means for automatically controlling and coordinating operation of each of said imaging means and said signature generating means.

4,878,737

OPTICAL LOW-PASS FILTER

Koichi Ise, Chiba, Japan, assignor to Sony Corp., Tokyo, Japan

Filed Dec. 16, 1987, Ser. No. 133,788
Claims priority, application Japan, Dec. 24, 1986, 61-313859
Int. Cl.[4] G02B *27/00*
U.S. Cl. 350—167 **7 Claims**



3. In an optical system of a color video camera having a horizontal scanning direction, an optical low-pass filter comprising:

a transparent substrate having opposed first and second major surfaces, means on at least one of said major surfaces of the substrate for defining first and second periodic structures, said first and second periodic structures extending parallel to each other at an angle to said horizontal scanning direction, and said first and second periodic structures having different periodic lengths measured

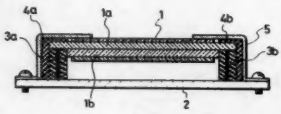
transversely to said first and second periodic structures, respectively.

4,878,738

ELECTRO-OPTICAL DEVICE

Takayoshi Hanami, Tokyo, Japan, assignor to Seiko Instruments, Inc., Tokyo, Japan

Filed Apr. 26, 1988, Ser. No. 186,283
Claims priority, application Japan, Apr. 27, 1987, 62-103709
Int. Cl.[4] G02F 1/13
U.S. Cl. 350—334 17 Claims



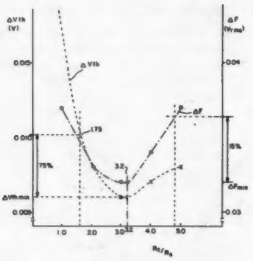
1. An electro-optical device comprising: an electro-optical panel having opposed inner and outer substrates, the outer one of which has a first group of lead terminals on the inner surface of the periphery thereof, a circuit board having a second group of lead terminals opposed and corresponding to the first group of the lead terminals, a resilient connector for electrically connecting together the first and second groups of the lead terminals, a frame for positioning both the electro-optical panel and connector to the circuit board, and a resilient buffer affixed to the resilient connector and between at least a portion of the electro-optical panel and the frame, the resilient connector and the buffer defining a gap which receives the periphery of the outer substrate therein so as to protect said outer substrate from externally applied shock.

4,878,739

LIQUID CRYSTAL DISPLAY DEVICE WITH PARTICULAR IMPEDANCE RATIO FOR SIGNAL AND COMMON ELECTRODES

Mitsuaki Shioji, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 30, 1988, Ser. No. 252,266
Claims priority, application Japan, Dec. 4, 1987, 62-307943
Int. Cl.[4] G02F 1/13
U.S. Cl. 350—336 1 Claim



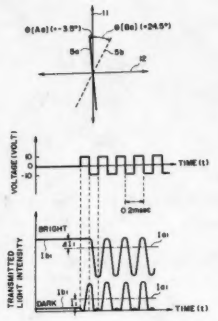
1. A liquid crystal display device having dot matrix electrodes comprising
a liquid crystal layer,
a plurality of mutually parallel elongated transparent belt-like first electrodes of length L_1 and width W_1, and
a plurality of mutually parallel elongated transparent belt-like second electrodes of length L_2 and width W_2, said first and second electrodes sandwiching said liquid crystal layer therebetween and crossing each other to form a lattice across said liquid crystal layer, said first and second electrodes having surface resistance R_1 and R_2, respectively, and the ratio R_1/R_2 being within 50% of L_2W_1/L_1W_2.

4,878,740

LIQUID CRYSTAL DEVICE

Yutaka Inaba, Kawaguchi, and Osamu Taniguchi, Chigasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 2, 1987, Ser. No. 56,646
Claims priority, application Japan, Jun. 3, 1986, 61-128813
Int. Cl.[4] G02F 1/13
U.S. Cl. 350—337 13 Claims



1. A liquid crystal device, comprising:
a liquid crystal cell comprising:
a pair of substrates; and
a chiral smectic liquid crystal assuming a first and a second orientation state in response to an electric field applied thereto, wherein said chiral smectic liquid crystal is disposed between said pair of substrates in a layer sufficiently thin to release its helical structure when no electric field is applied thereto; and
optical means for receiving the light from said chiral smectic liquid crystal,
wherein the time-average transmitted light intensity therethrough in either orientation state under the application of an alternating electric field having a time-average of zero not causing a transition between the first and second orientation states is substantially equal to the transmitted light intensity in either orientation state under no electric field.

7. A liquid crystal device according to claim 3, wherein the absorption axis of said polarizer or said analyzer or an axis forming an angle of 45° from the absorption or axis is located between two optic axes based on the first and second orientation states of said chiral smectic liquid crystal under no electric field.

4,878,741

LIQUID CRYSTAL COLOR DISPLAY AND METHOD

James L. Fergason, Atherton, Calif., assignor to Manchester R & D Partnership, Pepper Pike, Ohio

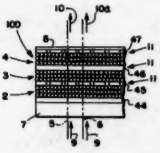
PCT No. PCT/US86/01863, § 371 Date Dec. 16, 1986, § 102(e) Date Dec. 16, 1986
Continuation-in-part of Ser. No. 707,486, Mar. 1, 1985, abandoned. This PCT application Sep. 10, 1986, Ser. No. 942,548
Claims priority, application PCT Int'l Appl., Sep. 10, 1986, PCT/US86/01863
Int. Cl.[4] G02F 1/13
U.S. Cl. 350—339 F 79 Claims

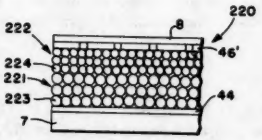
1. An optical device, comprising an assemblage of plural groups of volumes of liquid crystal material, a plurality of said volumes comprising discrete capsules formed by containment

medium of isolating polymer containing therein said liquid crystal material, the liquid crystal material in at least one of said groups comprising nematic or operationally nematic liquid crystal, the device being formed in such a way to maintain adequate resistivity to obtain a field across the liquid crystal material in response to an applied voltage to cause alignment of said liquid crystal material with respect to such field, said resistivity being obtained by purifying at least part of the containment medium prior to formation of the device.

2. An optical device, comprising plural groups of volumes of liquid crystal in a containment medium, a plurality of such groups containing in the volumes thereof respective pleochroic dye to color light transmitted therethrough, said volumes being arranged relative to each other in generally optically serial relation to affect color of light transmitted therethrough in a subtractive color operation, and at least one of such groups containing in the volumes thereof black pleochroic dye operative selectively to attenuate light incident thereon.

17. An optical device, comprising plural groups of volumes of liquid crystal in a containment medium, a plurality of such groups containing in the volumes thereof respective pleochroic dye to color light transmitted therethrough, said volumes being arranged relative to each other in generally optically serial relation to affect color of light transmitted therethrough in a subtractive color operation, and at least one of such groups containing in the volumes thereof black pleochroic dye operative selectively to attenuate light incident thereon, wherein each group of plural volumes is in a separate layer separated from one or more relatively adjacent layers by electrode means, said electrode means being operative for applying electric field to respective layers as a prescribed input to affect the alignment of liquid crystal structure and dye structure in such volumes, wherein at least one layer is more proximately exposed to a source of external optical radiation than another layer, and the liquid crystal in said more proximately exposed layer includes pleochroic dye that removes at least a substantial amount of ultraviolet optical radiation from such optical radiation emitted by such source prior to passing such optical radiation to a less proximately exposed layer, and wherein said volumes distort the natural structure of the liquid crystal in the absence of an electric field, and in the presence of such electric field the liquid crystal structure tends to aling with respect to such field.





4,878,742

LIQUID CRYSTAL OPTICAL MODULATOR

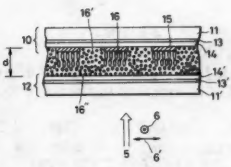
Yukitoshi Ohkubo, Yokohama; Yasuyuki Watanabe, Chigasaki; Chiori Mochizuki, Yokohama; Takayuki Ishii, Hiratsuka; Masato Yamanobe, Machida, and Kazuya Ishiwata, Yokosuka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 3, 1987, Ser. No. 80,892

Claims priority, application Japan, Aug. 4, 1986, 61-181938; Aug. 4, 1986, 61-181939

Int. Cl.[4] G02F 1/13

U.S. Cl. 350—347 V **11 Claims**



1. A liquid crystal optical modulator comprising liquid crystal material held between two substrates, each substrate having a light-transmissive electrode on a surface thereof, at least one of the substrates being provided with at least two kinds of minute alignment-treated regions formed in a regular periodic arrangement with a pitch P and one of the two subtrates has hemeotropic aligning ability and homogeneous aligning ability in periodic alignment and the other substrate has homogeneous aligning ability, wherein the gap between said two substrates is no larger than P and said alignment-treated regions each have different liquid crystal aligning ability than the other regions on the same substrate.

4,878,743

AUTOMOTIVE MIRROR USING ELECTROCHROMIC ELEMENT

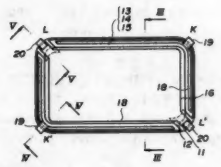
Toyoshi Aikawa, Ageo, and Eiichi Sekine, Higashimurayama, both of Japan, assignors to Ichikoh Industries Limited, Tokyo, Japan

Filed Jun. 7, 1988, Ser. No. 203,139

Claims priority, application Japan, Jun. 8, 1987, 62-141492

Int. Cl.[4] G02F 1/17, 1/23

U.S. Cl. 350—357 **3 Claims**



1. An automotive nonglaring mirror using an electrochromic element, comprising:

a generally rectangular glass substrate having four corners;

a first transparent electrode layer formed on said glass substrate with portions of a set of corners diagonally opposing each other among said four corners being left uncovered for a pair of insulative portions;

strip-shaped metal films formed longitudinally and laterally, respectively, on the first electrode layer and made of a material of a rather higher electric conductivity than said first electrode layer;

a first EC (electrochromic) layer located inside said metal films and formed as laminated on said first electrode layer;

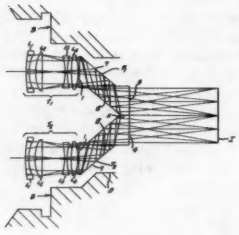
an electrolyte layer formed on said first EC layer;
a second EC layer formed on said electrolyte layer;
a second electrode layer having a portion extended to said pair of insulative portions, formed on said second EC layer and having a light reflective action;
a pair of first terminal fixtures secured near the corners in a set among the four corners of said glass substrate and electrically connected to said metal films;
a pair of second terminal fixture secured near the corners in another set among the four corners of said glass substrate and electrically connected to the extended portion of said second electrode layer; and
an insulative and protective layer insulating the exposed surface of said second electrode layer.

4,878,744

THREE DIMENSIONAL REFLEX LENS SYSTEMS

Robert S. Hilbert, La Canada, and Ronald J. Korniski, Glendora, both of Calif., assignors to Capitol Records, Inc., Los Angeles, Calif.

Division of Ser. No. 814,549, Dec. 30, 1985, Pat. No. 4,688,906. This application Jun. 26, 1987, Ser. No. 67,597
Int. Cl.[4] G02B *27/22, 9/64*
U.S. Cl. 350—447 **6 Claims**



1. A three-dimensional optical system adapted for use with reflex cameras, comprising: two parallel and adjacent lens systems each having a sequence of a negative lens element followed by a triplet lens, whereby each of said lens systems gathers and focusses an image onto a focal plane independently of the other lens systems, the focal plane on which one said lens system gathers and focusses an image being the same as the focal plane on which the other said lens system gathers and focusses an image, and the images formed by the said two lens systems being adjacent on the said focal plane.

4,878,745

OPTICAL SYSTEM FOR EFFECTING INCREASED IRRADIANCE IN PERIPHERAL AREA OF OBJECT

Kenji Endo; Shinichi Nagata, and Haruo Uemura, all of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

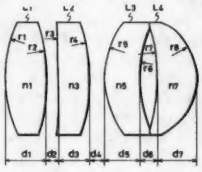
Filed Jul. 18, 1988, Ser. No. 220,624
Claims priority, application Japan, Jul. 17, 1987, 62-179630; Jul. 31, 1987, 62-193327; Jul. 31, 1987, 62-193328; Jul. 31, 1987, 62-193329; Aug. 7, 1987, 62-198775
Int. Cl.[4] G02B *9/34, 13/18, 9/06, 9/12*
U.S. Cl. 350—469 **6 Claims**

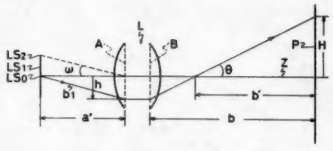
1. An optical system for use in illuminating an object comprising:
a light source;
an entrance pupil for receiving light from the light source;
an exit pupil for passing the light received to the object; and
an optical axis which extends through the optical system to the light source and the object respectively,
wherein the relationship among an incident height h to the entrance pupil, an illumination height H on the object and a changing rate (dh/dH) of the incident height and the illumination height is defined by a function f(H):

$$f(H)=(h/H)(dh/dH)$$

the optical system being designed so as to satisfy the following formula in the peripheral area of the object:

$$f(0)\leqq F(H)$$





f(0) being represented by the formula:

$$f(0)=[fa'/\{(a'-f)b'\}]^2$$

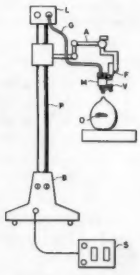
where a' is the distance between the light source and the primary principal point of the optical system, and b' is the distance between the real image of the light source and the object.

4,878,746

SURGICAL MICROSCOPE APPARATUS

Hiroshi Nakano; Toyoaki Takeuchi, both of Ina; Toshiyuki Tsunoda, Sagamihara, and Masahiko Kinukawa, Tokyo, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Apr. 7, 1988, Ser. No. 178,967
Claims priority, application Japan, Apr. 9, 1987, 62-87421; Oct. 12, 1987, 62-256518
Int. Cl.[4] G02B *21/00*
U.S. Cl. 350—507 **10 Claims**



1. A surgical microscope apparatus comprising:

a stereomicroscope for observing an affected part to be operated;
an illumination device attached to said microscope, including a lamp for illumination of the affected part to be operated;
a first failure detecting device, connected to said illumination device, for carrying out an initial examination and an ordinary examination of an operation of said illumination device;
a magnification and focusing device attached to said microscope for electrically controlling a magnifying and focusing of said microscope; and
a second failure detecting device, connected to said magnification and focusing device, for carrying out ordinary examination of operation of said magnification and focusing device.

4,878,747

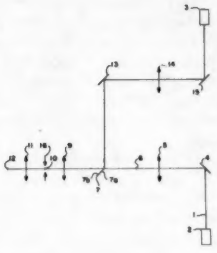
APERTURE IMAGE BEAM SPLITTER

Donald W. Sting, New Canaan, and Roger G. Messerschmidt, Westport, both of Conn., assignors to Spectra-Tech, Inc., Stamford, Conn.

Continuation of Ser. No. 13,584, Feb. 11, 1987, abandoned, which is a continuation-in-part of Ser. No. 707,231, Mar. 1, 1985, Pat. No. 4,653,880. This application Jan. 24, 1989, Ser. No. 302,112

Int. Cl.[4] G02B *21/06*

U.S. Cl. 350—511 **8 Claims**



7. An optics system for spectroscopic analysis comprising:
a radiant energy source;
a sample;
optics means to direct an incident radiant energy beam from the source to the sample, the optics being operative to focus the incident radiant energy beam at first and second sample image planes and at the sample;
the optics means including an aperture image beam splitter positioned between the first and second sample image planes;
the aperture image beam splitter being operative to discard part of the incident radiant energy beam from the system while transmitting the rest of the incident radiant energy beam through the second sample image plane to the sample and being further operative to transmit radiant energy reflected from the sample back through the second sample image plane to a detector.

4,878,748

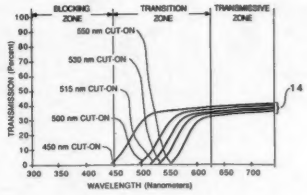
ULTRAVIOLET RADIATION AND BLUE LIGHT BLOCKING POLARIZING LENS

Laurie A. Johansen, and Paul Diffendaffer, both of La Crescenta, Calif., assignors to Suntiger, Inc., North Hollywood, Calif.

Continuation-in-part of Ser. No. 19,556, Feb. 26, 1987, abandoned. This application Mar. 28, 1989, Ser. No. 329,600

Int. Cl.[4] G02C *7/10, 7/12*

U.S. Cl. 351—44 **19 Claims**



1. A sunglass lens comprising:
(a) means to substantially block wavelengths in the electromagnetic spectrum that are between 300 nanometers and a specific sharp cut-on wavelength that is selected between a range of 450 and 550 nanometers, where the selection of the specific cut-on wavelength is based on a trade-off between visibility and safety that is determined quantitatively,
(b) means to substantially transmit wavelengths in the visible portion of the electromagnetic spectrum that are longer than 625 nanometers, and
(c) means to substantially block horizontally polarized light.

4,878,749

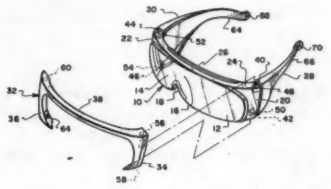
PROTECTIVE EYEWEAR WITH INTERCHANGEABLE DECORATIVE FRAMES

James E. McGee, 31635 Blue Meadow La., Westlake Village, Calif. 91361

Filed Jun. 29, 1988, Ser. No. 212,881

Int. Cl.[4] G02C *11/02*

U.S. Cl. 351—52 **2 Claims**



1. Protective eyewear with interchangeable decorative frames comprising:
preformed lens having a recessed border forming a frame;
right and left temple pieces on said preformed lens;
hinge means securing said temple pieces to said preformed lens;
said hinge means comprising posts formed on said temple pieces and hinge sockets formed on said preformed lens, said posts on said temple pieces constructed to snap into said hinge sockets on said preformed lens;
an interchangeable decorative frame fitting said recessed border around said preformed lens;
means detachably securing said interchangeable decorative frame to said preformed lens;
said means detachably securing said interchangeable decorative frame comprising posts formed on said decorative

frame and sockets formed on each end of said preformed lens; said posts on said interchangeable decorative frame constructed to snap into said sockets formed in said preformed lens;

said hinge sockets and said sockets for mounting said interchangeable decorative frame being the same sockets;

whereby said hinge sockets support both said temple pieces and said interchangeable frame so that said temple pieces and said interchangeable decorative frame may be easily removed and replaced to change the appearance of said protective eyewear.

4,878,750

OPHTHALMIC MEASURING APPARATUS

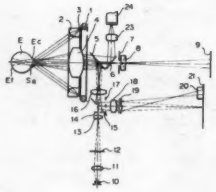
Kyoji Sekiguchi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 820,801, Jan. 22, 1986, abandoned. This application Mar. 3, 1989, Ser. No. 318,474

Claims priority, application Japan, Jan. 25, 1985, 60-13161; Feb. 9, 1985, 60-23728

Int. Cl.[4] A61B *3/10*

U.S. Cl. 351—212 **20 Claims**



1. An ophthalmic measuring apparatus comprising:

means for projecting a first target image onto the cornea of an eye to be examined;

a first photodetector means;

means for receiving a corneal reflection image of said first target image with said first photodetector means to obtain information on the corneal shape of the eye;

means for projecting a second target image onto an eye fundus of the eye;

a second photodetector means;

means for receiving an eye fundus reflection image of said second target image with said second photodetector means to obtain information on the refractive power of the eye;

signal processing means for calculating the shape of the cornea and the refractive power of the eye by receiving the output of said first photodetector means and said second photodetector means;

said signal processing means including means for providing an output signal indicating at least a degree of remaining astigmatism C_r obtained by subtracting a corneal astigmatism C_k of the eye from total astigmatism C_f of the eye; and

contact lens selecting means for selecting a contact lens matching the eye to be examined, based on the output signal of said signal processing means.

4,878,751

CAMERA SYSTEM

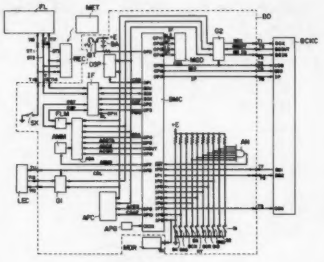
Yoshiiku Kikukawa, Kishiwada; Masayuki Nakasa, Sennan; Tadahiro Yoshida, Takatsuki; Mashio Kitaura, Tondabayashi; Masaaki Nakai, Kawachinagano; Takanobu Omaki, Sennan, and Nobuyuki Taniguchi, Tondabayashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 820,656, Jan. 21, 1986, Pat. No. 4,816,853. This application Mar. 24, 1989, Ser. No. 328,311

Claims priority, application Japan, Jan. 21, 1985, 60-9717; Feb. 13, 1985, 60-27398

Int. Cl.[4] G03B *7/08, 17/24*

U.S. Cl. 354—410 **9 Claims**



1. A camera system including a camera body and an adaptor attachable to the camera body, comprising;

means, provided in the camera body, for measuring light from an object to be photographed to produce light measuring signal indicating the measured light amount;

means, provided in the camera body, for producing film sensitivity signal corresponding to film sensitivity;

first means, provided in the camera body, for calculating exposure value based on the light measuring signal and the film sensitivity signal;

means, provided in the camera body, for transmitting the light measuring signal and the film sensitivity signal to the adaptor attached to the camera body;

means, provided in the camera body, for discriminating whether the adaptor is attached to the camera body;

second means, provided in the adaptor, for calculating exposure value based on the light measuring signal and the film sensitivity signal;

means, provided in the camera body, for reading the exposure value calculated by second calculating means when said discriminating means discriminates that the adaptor is being attached to the camera body; and

means, provided in the camera body, for controlling exposure operation of the camera in accordance with the exposure value read by the reading means when said discriminating means discriminates that the adaptor is being attached to the camera body, and in accordance with the exposure value calculated by the first calculating means when said discriminating means discriminates that the adaptor is not being attached to the camera body.

4,878,752

SIGHTING SYSTEM

David F. Bramley, Surrey, United Kingdom, assignor to The Marconi Company Limited, England

Filed Aug. 12, 1981, Ser. No. 292,746

Claims priority, application United Kingdom, Aug. 14, 1980, 8026544

Int. Cl.[4] G01B *11/26*

U.S. Cl. 356—152 **7 Claims**

1. A sighting system comprising:

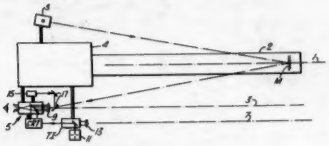
first and second optical sights mounted so as to have substantially the same field of view,

means for superimposing the field of view of the second optical sight on the field of view of the first optical sight,

means for controlling the field of view of each of the first and second optical sights within a limited angle,

means for providing a first line of sight marker in said first optical sight which marker is movable with the field of view,

means for providing a second line of sight marker in said second optical sight which marker is located with reference to the scene viewed,



and means for injecting a reference mark into the field of view of the first optical sight which reference mark can be aligned with the projected view of said second line of sight marker and is otherwise located with respect to the scene viewed,

alignment of the field of view of the second optical sight with the field of view of the first optical sight being effected by control of the field of view of the second optical sight to maintain the relationship between said reference mark and said second line of sight marker.

4,878,753

METHOD FOR MEASURING DOUBLE PRINT OFFSET IN PRINTING SYSTEMS

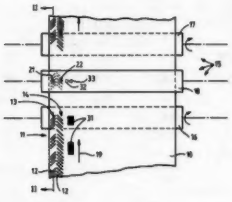
Johannes Nestmeier, Munich, Fed. Rep. of Germany, assignor to MAN Technologie GmbH, Munich, Fed. Rep. of Germany

Filed Jan. 5, 1988, Ser. No. 293,644

Claims priority, application Fed. Rep. of Germany, Jan. 14, 1988, 3800877

Int. Cl.[4] G01N *21/89*

U.S. Cl. 356—237 **13 Claims**



1. A method for measuring offset between doubly printed elements in a printing system comprising printing a test screen pattern consisting of test pattern strips, such strips being arranged so as to comply with a fishbone pattern and scanning the gray tone values of this test screen pattern by means of two sensors and evaluating measured data so obtained.

4,878,754

METHOD OF AND APPARATUS FOR MEASURING IRREGULARITIES OF ROAD SURFACE

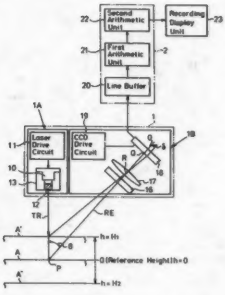
Kazuya Homma; Hiroshi Nogi; Koichi Yamada; Masahiro Kitazume; Masamitsu Uzawa, and Makoto Aoki, all of Tokyo, Japan, assignors to Tokyo Keiki Co. Ltd., Tokyo, Japan

Filed Oct. 14, 1987, Ser. No. 107,992

Claims priority, application Japan, Oct. 16, 1986, 61-246039; Oct. 16, 1986, 61-246040; Dec. 19, 1986, 61-303247; Dec. 19, 1986, 61-303248

Int. Cl.[4] G01B *11/30*

U.S. Cl. 356—376 **11 Claims**



1. An apparatus for measuring irregularities on a road surface by applying a beam spot to a measuring point on said road surface and detecting any change in the vertical position of the beam spot thereby determining the height of said measuring point from a reference height, said apparatus comprising:

a beam signal transmitting portion adapted for applying a light beam to said measuring point on said road surface;

a photo-sensor portion for detecting the spot formed on said road surface by said light beam;

an arithmetic circuit for conducting a predetermined arithmetic operation on the output from said photo-sensor portion so as to produce and output data concerning an irregularity on said road surface;

at least two amplifiers connected to the output of said photo-sensor portion in parallel with each other and having different amplification factors; and

data evaluation/selection circuit for selecting the output from one of said amplifiers as the optimum data and to deliver the selected data to said arithmetic circuit.

4,878,755

PROCESS AND DEVICE FOR MEASURING THE OPTICAL PROPERTIES OF THIN LAYERS

Hans-Joachim Siegmund, Babenhausen, and Horst Schwiecker, Berlin, both of, assignors to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Filed Jul. 3, 1986, Ser. No. 881,708

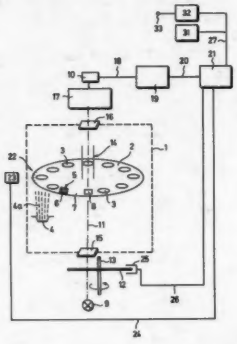
Claims priority, application Fed. Rep. of Germany, Mar. 29, 1986, 3610733

Int. Cl.[4] G01B *11/06*

U.S. Cl. 356—382 **1 Claim**

1. Apparatus for measuring the light transmission behavior of thin layers while they are being formed in a vacuum chamber with a coating source, in which a substrate holder is movably disposed and has facilities for holding at least one test object and for moving the test object along a path of motion, said apparatus comprising a measuring light source and a measuring light receiver, which is connected with the measuring light source by means of a path of rays, the path of motion of the test object passing consecutively through the stream of material emanating from the coating source and through the path of rays, wherein aside from the test object, at least one

opaque measuring zone and at least one measuring zone, which does not attenuate the measuring light beam, are disposed in the substrate holder, the substrate holder has signal transmitters for reporting the positions of the test object and of the measuring zones and outputs of the photodetector and the signal receiver are locked on to an arithmetic logic unit, in



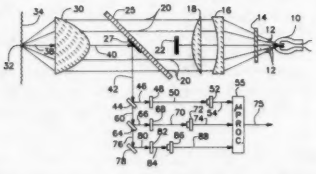
which the ratio of the measured value of the test object, decreased by measured value of the opaque measuring zone, to the measured value of the nonattenuating measuring zone, decreased by the measured value of the opaque measuring zone, is formed and in which the ratio can be evaluated as the transmission value of the test object.

4,878,756

METHOD AND APPARATUS FOR SENSING COLOR

Norman L. Stauffer, Arapahoe, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 8, 1988, Ser. No. 229,871
Int. Cl.[4] G01N *21/25*
U.S. Cl. 356—406 **34 Claims**



1. Color sensing apparatus comprising:

source means for producing radiation including at least first and second wavelength bands in a selected spectrum;

collimating means receiving the radiation from the source and producing a collimated beam of radiation generally along a first axis;

first substantially aspheric focusing means in said beam, focusing the radiation into a spot on a first surface, the color of which is to be sensed, said first focusing means receiving radiation reflected from the spot and re-collimating the reflected radiation back generally along the first axis;

first radiation detecting means positioned a first optical distance from the surface to receive energy from a predetermined cross-sectional area of the beam of reflected radiation and responsive to radiation in substantially only the first wavelength band;

second radiation detecting means positioned the first optical distance from the surface to receive energy from the predetermined cross-sectional area of the beam of reflected radiation and responsive to radiation in substantially only the second wavelength band; and

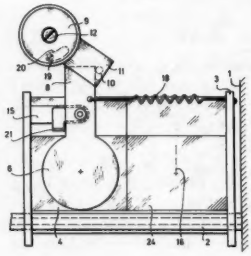
analyzing means connected to the first and second radiation detection means and operable to determine the relative amounts of radiation in the first and second wavelength bands as an indication of the color of the surface at the spot.

4,878,757

TUBE FOR A MICROSCOPE

Klaus Westphal, Oberkochen, Fed. Rep. of Germany, assignor to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Fed. Rep. of Germany

Filed Sep. 8, 1988, Ser. No. 242,329
Claims priority, application Fed. Rep. of Germany, Sep. 11, 1987, 8712342[U]
Int. Cl.[4] G02B *21/18*; G01N *21/59*
U.S. Cl. 356—432 **11 Claims**



1. A microscope tube comprising a prism carriage (3) movable within the tube between a first carriage position for visual observation of a specimen and a second carriage position for "photometry" or "photography" of said specimen, a diaphragm (6) coupled for movement with said prism carriage, said diaphragm being shiftable between a first diaphragm position blocking entrance of light from an eyepiece when said carriage is in its said second position and a second diaphragm position ineffective to block entrance of said light, a handle (9) mounted externally on said tube, and mechanical transmission means for actuating said diaphragm from said handle.

4,878,758

PROCESS FOR MIXING BULK MATERIALS

Roland Schäfer, Ortenberg, and Farid Rizk, Neuhofen, both of Fed. Rep. of Germany, assignors to Harth & Seifert GmbH, Grossenluder, Fed. Rep. of Germany

Filed Feb. 10, 1988, Ser. No. 154,326
Claims priority, application Fed. Rep. of Germany, Feb. 13, 1987, 3704535; Feb. 3, 1988, 3803085
Int. Cl.[4] B01F *13/02, 15/02*
U.S. Cl. 366—101 **5 Claims**

1. A method of blending fine-grained to powdery bulk materials by means of a pressure-tight jet gas blender container equipped with a pressure-tight admission port, a discharge port, a gas intake port and a gas exhaust port, said method comprising the steps of:

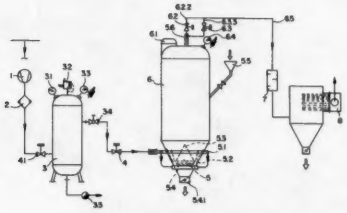
(1) filling said blender container approximately half full with said bulk materials;

(2) opening a first valve between a source of compressed gas and a compressed gas storage tank, capable of filling said blender container with between twice and ten times its gross volume of gas, so as to fill said tank with said compressed gas;

(3) closing said first valve and simultaneously opening a second valve between said blender container and said storage tank for a predetermined blending time t_1, so that

said compressed gas expands into said blender container through mixing nozzles located at the bottom of said blender container;

(4) simultaneously closing said second valve and opening said first valve for a predetermined settling time t_2 so that settling of the blended material can occur while the pressure in said blender container is maintained;



(5) at the end of said predetermined settling time t_2, opening third and fourth adjustable valves in said gas exhaust port, located between said blender container and a filter, in such a manner as to maintain the flow of gas through said exhaust port at an approximately constant flow rate; and

(6) removing said blended material from said blender container through said discharge port after said pressure in said blender container equals atmospheric pressure.

4,878,759

TURBINE MIXER

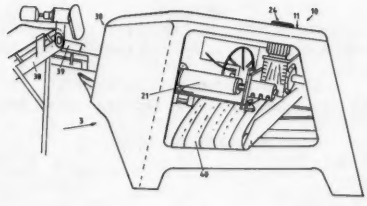
Robert K. Tomlinson, Rosewater, Australia, assignor to Monier Redland Limited, Australia

Filed Jul. 18, 1988, Ser. No. 220,492

Claims priority, application Australia, Jul. 20, 1987, PI3186

Int. Cl.[4] B28C *5/18*

U.S. Cl. 366—56 **12 Claims**



1. A concrete turbine mixer having a main frame, a sub-frame, a rotor comprising elastomeric material carried by the sub-frame, mixing blades on the rotor, drive means on the sub-frame coupled for drive to the rotor,

a bearing ring carried by the main frame, a barrel carrier supported by the bearing ring for rotation about an axis of the bearing ring, the barrel carrier comprising a plurality of supports extending in a direction away from the ring, a barrel of elastomeric material surrounding the rotor but contained within the barrel carrier, a plurality of flexible straps for supporting the barrel, the straps extending between respective said supports and an outer surface of the barrel, there being sufficient spaces between adjacent said supports to provide access to the outer barrel surface for deflection of the barrel wall such as to shed concrete when adhered to an inner surface of the wall.

4,878,760

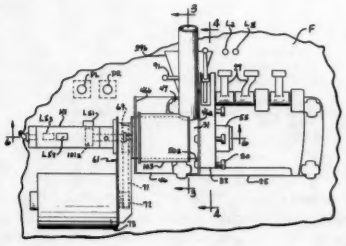
MIXING AND DISPENSING APPARATUS FOR A FROZEN CONFECTION MACHINE

Robert K. Newton, and Steven M. Schmalz, both of Beloit, Wis., assignors to Specialty Equipment Companies, Inc., Rockton, Ill.

Filed Apr. 19, 1989, Ser. No. 340,257

Int. Cl.[4] A23G *9/00*

U.S. Cl. 366—149 **30 Claims**



1. Mixing and dispensing apparatus for a frozen confection machine having a refrigerated freeze chamber comprising, mixing and measuring chamber means including a mixing cylinder having an inner side wall; a head having an inner face extending across one end of the side wall; and piston means mounted in the cylinder for movement between a first position in which an end face of the piston means is contiguous to the inner face of the head and a second position in which the end face of the piston means is spaced a selected distance from the inner face of the head, the mixing and measuring chamber means having discharge passage means and a discharge valve movable from a closed position blocking flow through the discharge passage means and an open position, the mixing and measuring chamber means having a confection material inlet port adapted for connection to the freeze chamber of the frozen confection machine and confection inlet valve means movable between a closed position blocking flow to the confection material inlet port and an open position, the mixing and measuring chamber means having a flavoring material inlet port and a flavoring material feed chamber communicating with the flavoring material inlet port, flavoring material feed means for feeding flavoring material from the feed chamber to the mixing and measuring chamber means, rotary mixer means in the mixing and measuring chamber means, means for driving the rotary mixer means to mix materials in the mixing and measuring chamber means, and means for moving the piston means from said second position to said first position to discharge material from the mixing and measuring chamber means.

4,878,761

DEVICE FOR DETECTING EXCESSIVELY HEATED WHEEL BEARINGS AND/OR WHEEL TIRES

Jens Dührkoop, Heidelberg, Fed. Rep. of Germany, assignor to Voest-Alpine AG, Linz, Austria

Filed Oct. 16, 1987, Ser. No. 110,521

Claims priority, application Austria, Oct. 17, 1986, 2771/86

Int. Cl.[4] B61L *3/06;* **G01J** *5/10*

U.S. Cl. 374—124 **22 Claims**

1. A system for measuring the temperature of and detecting excessively heated wheel bearings and/or wheel tires of rail vehicles running on a track at a measuring point within a fixed field of vision wherein the system is stationarily arranged in the vicinity of the track and the position of the measuring point varies in a random manner over the length of the bearing along a known axis within a fixed field of vision, comprising:

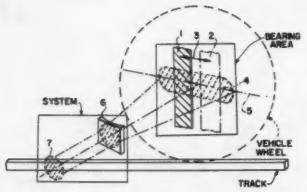
heat sensing means for detecting infrared radiation and measuring the temperature of the wheel bearings;

infrared object lens means for scanning infrared radiation

emitted from the measuring point and to produce an image thereof;

infrared focusing lens means for focusing scanned infrared radiation onto said heat sensing means; and

afocal anamorphotic cylinder lens means for anamorphotically scanning the image produced by said infrared object



lens means and for focusing the image into a beam having a substantially circular symmetrical shape on said infrared focusing lens means, wherein said afocal anamorphotic cylinder lens means widens the image in one axial direction to extend narrowly across an area at least equal to the fixed field of vision within which the position of the measuring point vaires

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4,878,762

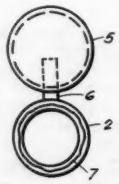
SECRETION CONTAMINATED INDWELLING TUBE CLOSED REMOVAL AND DISPOSAL SYSTEM

Joseph F. Uddo Jr., 1201 Ridgelake Dr., Metairie, La. 70001, and John R. Breaux, 327 Bonnebel Blvd., Metairie, La. 70005

Filed Jan. 13, 1988, Ser. No. 143,177

Int. Cl.[4] B65B *39/06*

U.S. Cl. 383—33 **2 Claims**



1. An apparatus for isolated, sanitary reception and disposal of a contaminated tube comprising:

a rigid, tubular, hand-held cannister having a first and a second open end therein;

means for sealingly capping said first end;

an elongate, impervious flexible sheath having an open receiving end;

said sheath being sealingly affixed at said open end interior to said receptacle means, having a first collapsed position within said receptacle and a second, extended enclosing position distal of the second end of said receptacle;

the first open end of said hand-held canister having means for directing the free end of a contaminated tube to the interior of said cannister within said sheath;

said means for directing said free end comprising an inwardly extending bevel extending circumferentially around said open mouth.

4,878,763

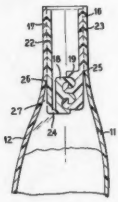
DOUBLE HINGE ZIPPER CONSTRUCTION

Steven Ausnit, New York, N.Y., assignor to Minigrip, Inc., Orangeburg, N.Y.

Filed Nov. 30, 1988, Ser. No. 277,979

Int. Cl.[4] B65D *33/16*

U.S. Cl. 383—65 **17 Claims**



1. A reclosable bag structure comprising in combination:

front and back flexible plastic film wall panels attached along their bottom and, side edges and separated at their top edges to form a bag with a top filling opening;

and separate first and second complementary pressure closable and reopenable closure strips having interlocking profiles in confronting relationship within said top opening and each strip attached to the inner surface of a wall panel;

the first strip having a web portion attached at its base from a location below the center line of the interlocking profiles, with said web portion extending upwardly therefrom;

the second strip having a web portion attached at its base from above the center line of the interlocking profiles, with said web portion extending upwardly therefrom;

said web portions being surface bonded to the inner surfaces of the front and back panels respectively so that forces on the panels from internally of the bag will pivot the strips in a hinge action about their base so as to pull the closure strips with a shear action which resists separation of said strips.

4,878,764

DRAW-STRING CARRYING BAG

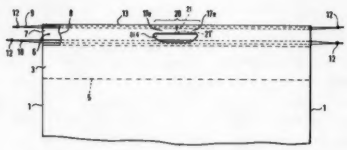
Alfons Meyer, Wallensteig 6, D-7056 Weinstadt 3, Fed. Rep. of Germany

Filed May 9, 1988, Ser. No. 191,605

Claims priority, application Fed. Rep. of Germany, May 28, 1987, 8707670

Int. Cl.[4] B65D *33/28*

U.S. Cl. 383—72 **19 Claims**



1. Corded or draw-string carrying bag of web-like material, particularly plastic foil, having a mouth portion (2), which mouth portion includes

folded-over end portions (8) and seams (5) seaming the folded-over end portion (7) to an adjacent underlying portion (8) of the side of the bag, to define channels (3, 4, 6); and

at least one cord or draw-string (9, 10; 11) passed through the channels,

wherein, in accordance with the invention,

the mouth portion is formed with an opening (**14**) therein which is free or open for a portion only of the channel, and a solid strip of material (**20**) is provided, extending, at the mouth of the bag (**2**) from the opening across the channel and toward said opening, and covering said cord or draw-string;

said solid strip of material being formed with a tear or yield line (**21**) extending transversely through said solid strip of material to permit tearing the solid strip of material to extend the opening, to then permit access to the at least one cord or draw-string (**9, 10; 11**), and to form mutually approaching channel regions (**17***e*),

the mutually approaching regions, upon pulling out of the at least one cord or draw string from the opening and upon tearing or severing of the tear or yield line, causing said mutually approaching regions to form collar-like pleats or folds adjacent the folded-over edge defining the channel.

4,878,765

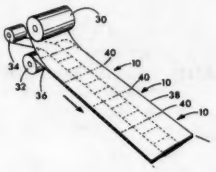
FLEXIBLE PACKAGING SHEETS AND PACKAGES FORMED THEREFROM

James D. Watkins, Prior Lake; David W. Andreas, and David H. Cox, both of Minneapolis, all of Minn., assignors to Golden Valley Microwave Foods, Inc., Edina, Minn.

Continuation of Ser. No. 740,252, Jun. 3, 1985, Pat. No. 4,735,513. This application Mar. 28, 1988, Ser. No. 174,491

Int. Cl.[4] **B65D** *30/02*

U.S. Cl. 383—116 **15 Claims**



1. A flexible laminate folded into the form of a bag, said bag enclosing a food product adapted to be heated within the bag in a microwave oven, said laminate comprising,

an enclosed layer of a microwave interactive coupling material comprising a lossy substance which becomes hot within a microwave oven,

said microwave interactive layer being positioned within only that portion of said laminate located beneath the food product when the food product is heated in the bag within a microwave oven,

said microwave interactive layer being incorporated into a wall of the bag supporting the food product during heating whereby the food is adapted to rest upon the laminate in heat conductive relationship with the microwave interactive layer therebeneath,

said laminate including at least two layers of flexible backing sheet material one of which is an inner layer positioned between the interactive layer and the food product, one of said backing sheets being bonded to each side of the microwave interactive layer to form a sandwich structure in which the microwave interactive layer is encapsulated by being enclosed between the flexible backing sheets on each side thereof,

at least the inner layer of backing sheet material being composed of nonthermoplastic cellulosic fibers that assist in preserving the integrity and dimensions of the interactive layer upon exposure to microwave energy, and

during heating, the heat being transferred from the interactive layer by conduction to the overlying food product whereby the food is heated by the heat transferred from the microwave interactive layer through the inner backing sheet to raise the temperature of the food body by heating one surface thereof without damaging portions of the bag remote from the food.

4,878,766

HIGH SPEED SELF-LUBRICATING BEARING-SEAL ASSEMBLY

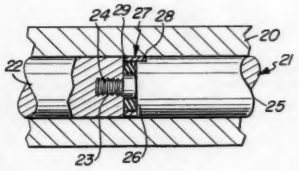
Richard M. Boyd, St. Louis Park, Minn., assignor to Quadion Corporation, Minneapolis, Minn.

Filed Aug. 25, 1988, Ser. No. 235,438

The portion of the term of this patent subsequent to Jun. 14, 2005, has been disclaimed.

Int. Cl.[4] **F16C** *33/74, 9/00, 15/00*

U.S. Cl. 384—130 **32 Claims**



1. A self-lubricating bearing-seal assembly comprising:

(a) a molded annular bearing-seal member comprised of readily moldable plastic material having inherent self-lubricating qualities with a pressure-velocity value of no less than 1800 at 100 feet per minute surface speed;

(b) said bearing-seal member being of uniform radial dimensions throughout its cross-section and having a sealing surface and a pressure-receiving surface opposite to and spaced radially from said sealing surface;

(c) support-structure mounted in supporting relation to said bearing-seal member and having a sealing surface opposite same and having an annular groove formed therein opposite said surfaces and in the same radial plane as said bearing-seal member;

(d) a continuous annular combined spring and sealing member mounted under slight radial compression within said groove in supporting relation to said bearing-seal member and being of lesser radial dimension than said groove;

(e) said combined spring and sealing member being formed of uniformly resilient, flowable rubber-like material throughout and bearing against said pressure-receiving surface of said bearing-seal member in radial pressure-applying relation;

(f) the combined radial dimensions of said bearing-seal member and said combined spring and sealing member in its free-form being slightly in excess of the depth of said groove whereby said combined spring and sealing member maintains said bearing-seal member under slight compression against said support-structure sealing surface at all times; and

(g) said combined spring and sealing member having maximum axial dimensions slightly less than the axial dimensions of said groove.

4,878,767

SLEEVE BEARING

Hans-Joerg Halder, Mannheim, Fed. Rep. of Germany, assignor to Firma Carl Freudenberg, Weinheim, Fed. Rep. of Germany

Filed Jan. 23, 1989, Ser. No. 300,432

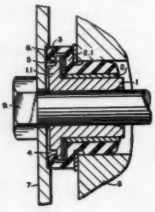
Claims priority, application Fed. Rep. of Germany, Feb. 17, 1988, 3804886

Int. Cl.[4] **F16C** *33/74*

U.S. Cl. 384—140 **6 Claims**

1. In a sleeve bearing comprised of inner and outer sleeves, each having an outwardly projecting radial flange, being mounted for relative rotation with the inner sleeve inside the

outer sleeve and contacting one another at said outwardly projecting flanges, the outer sleeve consisting of rubber on the side of the profile facing away from the inner sleeve and contacting the flange of the inner sleeve with a circumferential sealing lip; the improvement wherein the sealing lip of the



outer sleeve reaches externally around the profile of the projecting flange of the inner sleeve and contacts the flange of the inner sleeve with a sealing edge under resilient bias on the side facing axially away from the projecting flange of the outer sleeve.

4,878,768

BEARING HAVING AN IMPROVED CORROSION-RESISTANCE

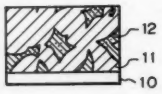
Tatsuhiko Fukuoka, and Takashi Suzuki, both of Toyota, Japan, assignors to Taiho Kogyo, Ltd., Aichi, Japan

Filed Aug. 4, 1988, Ser. No. 228,092

Claims priority, application Japan, Feb. 13, 1987, 62-029807

Int. Cl.[4] F16C *33/12*

U.S. Cl. 384—279 **11 Claims**



1. A bearing having an improved corrosion resistance, comprising:

a base plate; and,

a bearing layer of Cu-series alloy which has the first surface facing said base plate and the second surface opposite to the second surface and which consists essentially of a Cu-alloy phase forming a skeleton structure extending between said first surface and second surface and a Pb-containing phase filling essentially clearances of the skeleton structure, wherein at least a part of said Pb-containing phase including the second surface contains In until a depth exceeding approximately 20 μm measured from the second surface.

4,878,769

CENTER-FREE ROLLER BEARING

Martin Schepp, Schweinfurt, Fed. Rep. of Germany, assignor to SKF GmbH, Fed. Rep. of Germany

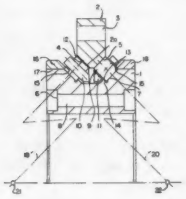
Filed Sep. 26, 1988, Ser. No. 248,736

Claims priority, application Fed. Rep. of Germany, Oct. 3, 1987, 8713304

Int. Cl.[4] F16C *19/34, 33/36*

U.S. Cl. 384—618 **10 Claims**

1. Center-free rolling bearing assembly for machine tools comprising a disk-shaped outer ring, two adjacent outer raceways on an inner radial edge of said outer ring which converge conically together in an axially and radially inward direction, an inner ring, two conical inner raceways on a lateral surface of the inner ring, parallel to said outer raceways, a row of cylindrical rolling elements between each outer raceway-inner raceway combination, inner and outer guide flanges for guiding the rolling elements of each row, the outer raceways (**4, 5**) forming a single piece with the outer ring (**2**) and the inner raceways (**6, 7**) forming a single piece with the inner ring (**1**),



at least one of the outer guide flanges being formed by an outer flange ring (**16**) which can be fixed in place on a seating section (**18**) of the lateral surface of the inner ring so that the rolling elements (**9**) can be installed between the inner and outer raceways.

4,878,770

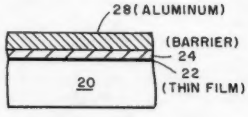
IC CHIPS WITH SELF-ALIGNED THIN FILM RESISTORS

Paul A. Ruggierio, Littleton, Mass., and Cynthia E. Anderson, Glenview, Ill., assignors to Analog Devices, Inc., Norwood, Mass.

Filed Sep. 9, 1987, Ser. No. 94,513

Int. Cl.[4] H01C *1/012*

U.S. Cl. 388—308 **5 Claims**



1. An IC chip comprising:

a substrate for carrying IC components including transistor elements;

metal interconnect having side edges and formed above said substrate in a pattern to make connections to said elements of the IC;

said pattern comprising at least two spaced-apart portions of metal interconnect having ends separated by a gap;

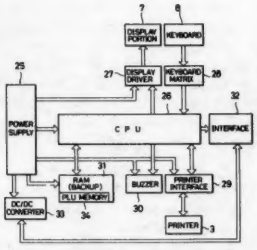
a layer of thin film above said substrate and beneath said metal interconnect in all portions thereof and making electrical contact therewith, said thin film layer having side edges aligned vertically with the side edges of said metal interconnect and forming layered segments; and

a layer of additional thin film material in said gap between said spaced-apart portions of metal interconnect, said additional thin film material being integral with the thin film material beneath said spaced-apart portions and having the same width and thickness as the thin film beneath said spaced-apart portions, said additional thin film material serving as at least one resistor for the circuit of said IC chip.

4,878,771
LABEL PRINTER

Manabu Nishida, Shizuoka, Japan, assignor to Tokyo Electric Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 50,566, May 18, 1987, abandoned. This application Jun. 24, 1988, Ser. No. 212,159
Claims priority, application Japan, May 22, 1986, 61-118135
Int. Cl.[4] B41J *5/31*
U.S. Cl. 400—70 **1 Claim**



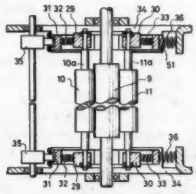
1. A label printer comprising:
a central processing unit;
a keyboard comprising means for inputting data to the central processing unit;
a printer unit comprising means for outputting data from the central processing unit;
a display unit for displaying data from the central processing unit; and
a random access memory connected to said central processing unit, said memory having PLU memory means including:
(a) means for storing commodity item numbers,
(b) means for storing PLU numbers,
(c) means for storing commodity names,
(d) means for storing bar code data,
(e) means for storing a number of sheets issued from the printer unit,
(f) means for storing department codes,
(g) means for storing commodity prices, and
(h) retrieval storage means for storing commodity retrieval codes comprising data for the conditions of the place where each commodity is physically located, including the order of display, shelf number, gondola number, passage number and the number of said commodities located at said place, said retrieval storage means enabling said printer unit to print and issue labels including bar code, department code and price for commodities corresponding to a retrieval code inputted from said keyboard, whereby the labels may be printed and issued for commodities where only the conditions of the place where the commodity is physically located is known.

4,878,772
THERMAL TRANSCRIPTION PRINTER

Hiroshi Fukumoto; Koji Namura, both of Amagasaki; Kenichi Naruki, and Ryuzo Une, both of Fukuyama, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 1, 1988, Ser. No. 226,931
Claims priority, application Japan, Aug. 8, 1987, 62-198560
Int. Cl.[4] B41J *3/02, 13/02*
U.S. Cl. 400—120 **4 Claims**

1. A thermal transcription printer comprising:
a thermal head for supplying heat energy to an ink ribbon pressed on a paper to be transcribed of an image;
a platen whereon said paper is to be wound and reciprocatively conveyed by clockwise and counterclockwise rotations whereof;
a pair of pinch rollers disposed with pressing forces onto insertion side and ejection side of said platen for pressing said paper to said platen; and

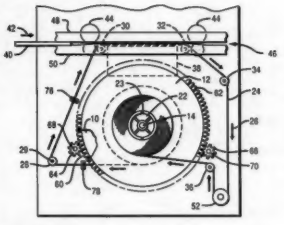


a pressure control means for making pressing force of said pinch rollers, in a manner that pressing force of the pinch roller of backward position with respect to a conveyance direction of said paper is smaller than that of the forward position.

4,878,773
RIBBON FEED CONTROL APPARATUS AND METHOD

Ali T. Mazumder, Waterloo, Canada, assignor to NCR Corporation, Dayton, Ohio

Filed Jun. 8, 1988, Ser. No. 203,962
Int. Cl.[4] B41J *33/34*
U.S. Cl. 400—234 **1 Claim**



1. Ribbon feed control apparatus comprising:
apparatus support means;
ribbon supply means on which a supply of ribbon may be placed, said ribbon supply means being rotatably mounted on said apparatus support means;
ribbon take-up means rotatably mounted on said apparatus support means;
first drive means for driving said ribbon take-up means in a first direction of rotation;
ribbon advance timer means for controlling operation of said first drive means;
second drive means for driving said ribbon supply means in a second direction of rotation;
ribbon tension means for controlling operation of said second drive means;
guide means for guiding said ribbon in a path from said ribbon supply means to said ribbon take-up means;
control means for providing information as to the distance which said ribbon is to be advanced during a given operation;
measuring means for measuring the distance which said ribbon is actually advanced during a given operation;
comparison means coupled to said control means, said measuring means and said ribbon advance timer means for providing a halt signal to said ribbon advance timer means

when ribbon distance information provided by said control means and by said measuring means are equal;

adjustable delay means comprising coupled resistor means, including a potentiometer, and capacitor means for determining time duration, said adjustable delay means being controlled by said ribbon advance timer means for controlling initiation of operation of said ribon tension means after a predetermined time period greater than zero following termination of operation of said first drive means; and

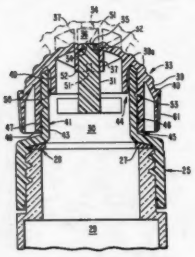
ribbon tension sensing means coupled to said ribbon tension means for causing operation of said ribbon tension means when said ribbon in said path between said ribbon supply means and said ribbon take-up means is slack, whereby said ribbon tension means is operable to operate said second drive means to drive said ribbon supply means in said second direction of rotation to take-up said slack after expiration of said predetermined time period greater than zero.

4,878,774

VALVED DISPENSING APPLICATOR

Craig E. Karasin, Orangetown, N.Y., and Joseph Thompson, Upper Saddle River, N.J., assignors to Sterling Drug Inc., Rensselaer, N.Y.

Filed Aug. 12, 1987, Ser. No. 84,571
Int. Cl.[4] B05C *17/00*
U.S. Cl. 401—15 **19 Claims**



1. A dispenser comprising:

a container body having an opening at one end thereof and a cavity therein in fluid communication with said opening;

a mounting member detachably mounted to said container body at said one end of said container body, said mounting member having a flow passage therethrough in fluid communication with said opening in said container body, said mounting member including a closure member extending in an axial direction away from said container body;

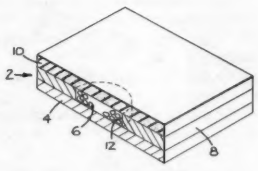
a dispensing head movably mounted on said mounting member, said dispensing head being movable in said axial direction towards said mounting member to a closed position and movable in said axial direction away from said mounting member to an open position, said dispensing head having at least one aperture therein for dispensing a flowable substance stored in said container body, said closure member including aperture sealing means for sealing said at least one aperture when said dispensing head is in said closed position, said dispersing head further including an axially extending wall defining a skirted chamber in fluid communication with said at least one aperture, said axially extending wall of said dispensing head having a radially inner surface sealingly engaging an outer periphery of said closure member when said dispensing head is in positions between and including said open and closed positions such that the flowable substance in the flow passage is prevented from passing between the sealingly engaged portions of the inner surface of the wall and the outer periphery of the closure member, said wall having a radially outer surface in fluid communication with said flow passage of said mounting member, and said wall having a free end defined by a terminal edge extending between said radially inner and outer surfaces, and said skirted chamber including flow controlling means for controlling flow of the flowable substance from said flow passage of the mounting member into said skirted chamber when said dispensing head is in the open position so that excess dripping of the flowable substance from the dispensing head is avoided during use thereof, said flow controlling means comprising at least one contiguous elongated slot extending through said wall and open at said terminal edge thereof, the entire said at least one slot extending over the outer periphery of said closure member when said dispensing head is in the closed position.

4,878,775

LIQUID TRANSFER DEVICE

R. James Norbury, and Daniel B. Pendergrass, Jr., both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 28, 1987, Ser. No. 114,435
Int. Cl.[4] A61M *35/00*; B05L *1/00*
U.S. Cl. 401—132 **11 Claims**



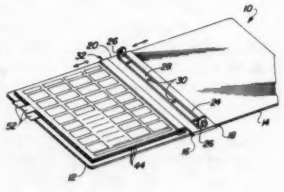
1. An applicator device capable of carrying liquid material to be applied to a surface comprising a flat support layer, liquid containing microcapsules of between 200 and 300 microns on at least one surface of said support layer, a flat structural layer with a hole therein for providing a raised area around all of said microcapsules, and a flexible, liquid-permeable material overlaying the microcapsules, said support layer being less flexible than said liquid permeable material, and said microcapsules being bonded to said support layer by an adhesive, said raised area being above the highest level of said microcapsules.

4,878,776

BINDER FOR TELEPHONE DIRECTORIES AND THE LIKE

George Orlandini, 166 Brentwood La., Fairport, N.Y. 14450

Filed Mar. 9, 1989, Ser. No. 321,425
Int. Cl.[4] B42F *11/02*
U.S. Cl. 402—4 **9 Claims**



1. For use with a telephone directory having pages of predetermined size, a binder having a spine and top and bottom covers attached to the spine and adapted to respectively overlie the top and bottom faces of the directory, means removably

for attaching the binder to the directory, an auxiliary sheet folded in accordion fashion and disposed inside the binder top cover so as to normally lie atop the directory top face, the sheet having one edge disposed adjacent to the spine and adapted to be unfolded outwardly when the binder is opened so as to present an area several times greater than the predetermined size of the page in the directory, and means removably attaching the sheet to the binder along said one edge of the sheet.

4,878,777

SOCKET FOR A CONTROL PANEL

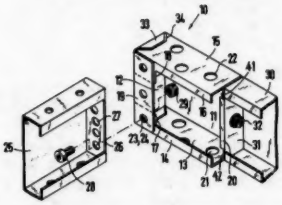
Jürgen Debus, Dietzhölztal, and Lothar Lehr, Oberdresselndorf, both of Fed. Rep. of Germany, assignors to Rittal-Werk, Herborn, Fed. Rep. of Germany

Filed Mar. 15, 1988, Ser. No. 168,374

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1987, 3720576

Int. Cl.[4] F16B *1/00*

U.S. Cl. 403—205 **11 Claims**



1. In a socket for a control panel of the type having four corner pieces and at least two longitudinal and two transverse box-like recess members connected to form a frame, in which each corner piece has: two vertical outside walls at right angles to each other; vertical mounting flanges along the free vertical edges of the outside walls, said vertical mounting flanges having boreholes; and horizontal panel-mounting flanges along the horizontal edges of, and bent at right angles to, the outside wall and adjacent to the longitudinal recess member, the panel-mounting flanges having panel-mounting boreholes and free edges; and the box-shaped recess members being connected to the vertical mounting flanges such that they are aligned with said outside walls, the improvement in the corner pieces comprising:

vertical connecting flanges (**17, 18**) bent at substantially right angles to, and along the free edges of, the horizontal panel-mounting flanges (**13, 15**) at least in the area of the vertical mounting flange (**19**),

whereby said vertical connecting flanges are connected to the vertical mounting flange (**19**) in attachement of said corner piece to said transverse recess member (**25**).

4,878,778

CONCRETE PATH PAVER

Pat Bresnahan, 3210 W. Woodthrust St., Lecanto, Fla. 32661

Filed Apr. 14, 1988, Ser. No. 181,384

Int. Cl.[4] E01C *19/48*

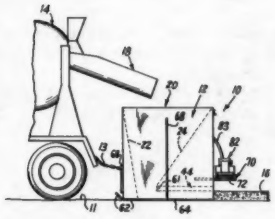
U.S. Cl. 404—105 **10 Claims**

1. A concrete path paver for slip forming a slab of concrete onto a dirt pathway, the upper surface of the dirt pathway constituting a plane of construction, comprising in combination:

a box having a front wall extending downwardly at an angle through the box to the plane of construction, and an inwardly sloping rear wall extending downwardly at an angle through the box to a location above the plane of construction, and opposing side walls coupling the front and rear walls extending downwardly to at least the plane of construction to define a closed box having only an upper opened end for receiving concrete and a lower opened end with a vertically disposed opened mouth defined by the vertical edges of said side walls and the lower horizontal edge of said rear wall, with said lower opened end having a smaller cross-sectional area than said upper opened end;

a fixed screed for slip forming the concrete, means for securing said screed at its edges to said side walls below said rear wall with a mouth of said screen being positioned about said opened mouth of said rear wall;

a plate secured at its edges to said side walls across a lowermost front edge of said box, said plate being upwardly



turned to create a ski-like effect upon movement of the paver on the pathway;

a pair of skids affixed to a lowermost edge of said sidewalls of said box causing said box to float upon the pathway during movement of the paver; and

hitch means connected relative to said front of said box allowing the paver to be connected immediately behind a cement truck by means of a chain or like such that concrete being dispensed from the chute of the cement truck flows into said upper opened end of said box to fill the same while said screed slip-forms the concrete from said opened mouth of said lower opened end into a concrete slab laid directly on the pathway.

4,878,779

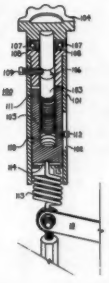
RIDING POWER TROWEL

Marvin E. Whiteman, Jr., 2254 Braniff St., Boise, Id. 83705

Filed Feb. 3, 1989, Ser. No. 306,089

Int. Cl.[4] E01C *19/22*

U.S. Cl. 404—112 **1 Claim**



1. In a riding surface working machine having a pair of overlapping counter rotating rotor assemblies and a control linkage there between, a trim control which comprises:

a hollow cylindrical housing being rigidly attached to a stationary point on the riding surface working machine

and having a traveler slot disposed in one side being parallel to the housing's longitudinal axis;

a cylindrical traveler block being slidably inserted into said cylindrical housing and having a coaxial threaded bore in a first end;

a shoulder bearing coaxially installed in a first end of said cylindrical housing having a radially disposed threaded through hole and an allen screw engaged therewith;

a control bolt having a scalloped knob coaxially attached to a first end and a threaded second end sized for and being in threaded engagement with the threaded bore of said first end of said traveler block, said control bolt further having a coaxial groove circumscribing its outer surface and disposed for slidable engagement with said allen screw;

a stop dog being radially attached to said traveler block and extending radially through the traveler slot in said cylindrical housing; and

a tensive spring having a first end attached to a second end of said traveler block and a second end attached to the control linkage.

4,878,780

APPARATUS AND METHOD OF CREATING AND CONTROLLING AN ARTIFICAL WATER TABLE

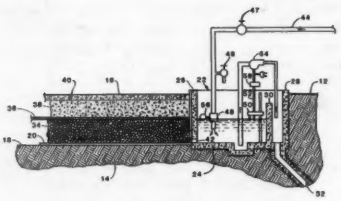
Stephen P. Vidal, P.O. Box 973, Anza, Calif. 92306-0973

Continuation-in-part of Ser. No. 517,012, Jul. 25, 1983, Pat. No. 4,576,511. This application Mar. 10, 1986, Ser. No. 838,320

The portion of the term of this patent subsequent to Mar. 18, 2003, has been disclaimed.

Int. Cl.[4] E02B *13/00*

U.S. Cl. 405—38 **6 Claims**



1. A subsurface irrigation system for supplying moisture to an elongated strip of land, comprising:

a ditch having a bottom from which two walls extend upwardly;

a strip of water-impermeable material covering the bottom of the ditch and extending at least part way up the sides of the ditch, thereby forming a watertight trough;

a ballast layer within the watertight trough, of substantially uniform thickness, and including interstices through which water can flow in any direction;

a fine layer composed predominantly of fine particulate material through which water is dispersed by capillary action; and,

a strip of permeable material through which water can pass readily but through which the fine particulate matter of said fine layer cannot pass, bonded to said sheet of water-impermeable material, disposed on top of said ballast layer, and on which said fine layer rests, whereby said strip of permeable material prevents the fine particulate material of said fine layer from settling into said ballast layer and clogging the interstices of said ballast layer thereby choking off the flow of water through said ballast layer.

4,878,781

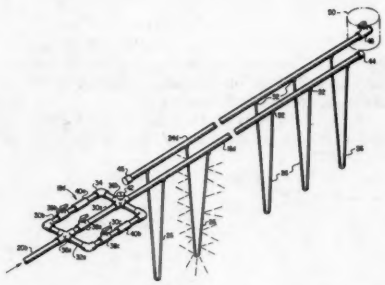
MOISTURE CONTROL SYSTEM FOR A FOUNDATION

Steven D. Gregory, 425 Sheffield, Richardson, Tex. 75081, and Joseph R. Holler, 5616 Spring Valley Rd., Apt. 125, Dallas, Tex. 75240

Filed Dec. 6, 1988, Ser. No. 280,377

Int. Cl.[4] E02B *11/00*

U.S. Cl. 405—52 **7 Claims**



1. A moisture control system for controlling the moisture level of subsoil adjacent the foundation of a building comprising a source water, supply pipe means extending in said subsoil along an area adjacent said foundation and connected to said water source, accumulator pipe means disposed adjacent said supply pipe means, and a plurality of generally U-shaped porous pipes each extending away from and substantially orthogonal to said supply pipe means and said accumulator pipe means, and each being connected between said supply pipe means and said accumulator pipe means for receiving water from said supply pipe means and allowing said water to seep out into said subsoil, said accumulator pipe means adapted to receive the water from said porous pipes that does not seep therefrom.

4,878,782

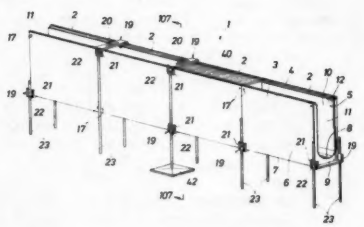
DRAIN CHANNEL ALIGNMENT AND INSTALLATION APPARATUS

Thomas B. Beattie, 213 Riverdale Ave., Vacaville, Calif. 95688; Fred M. Schweinberg, 15819 Lakecliffe, Houston, Tex. 77095, and Ronald L. Rutzen, 238 Greenbow, Highlands, Tex. 77562

Filed Dec. 11, 1987, Ser. No. 132,082

Int. Cl.[4] E02B *5/00*

U.S. Cl. 405—119 **10 Claims**



1. A strap for installing and aligning a drainage channel comprised of two or more drainage channel sections locatable in a trench, each drainage channel section having spaced-apart walls with inner and outer wall surfaces, a bottom with inner and outer wall surfaces, the inner wall and bottom surfaces forming a U-shaped channel with a top opening and at least one end opening, the end opening of a first section made so as to operatively engage with the end opening of a second section

and each channel section having at least one alignment anchor indentation on the outside surface of each wall near the end opening, wherein said strap comprises a body with two arms attached to the body, the combination of the body and the arms essentially forming a U, the distance between the arms being slightly larger than the distance between the outside surface of the drainage channel walls, each arm having a spike attachment means for accepting, sliding over and attaching to a spike and at least two threaded channel holes with channel indentation bolts therein, the threaded channel holes being positioned on the arm so that when the strap is placed over the channel top opening or under the channel bottom at the joint between two drainage channel sections, with the arms extending over the outer surface of the channel walls, at least one threaded channel hole is positioned over the alignment anchor indentation of the first channel section and at least a second threaded channel hole is positioned over the alignment anchor indentation of the second channel section when the two channel section end openings are joined and aligned.

4,878,783

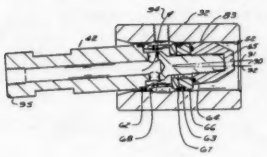
HYDRAULIC STAB CONNECTOR WITH ANGULAR FREEDOM

Benton F. Baugh, 14626 Oak Bend, Houston, Tex. 77079

Filed Dec. 28, 1987, Ser. No. 138,433

Int. Cl.[4] F16L *1/04*

U.S. Cl. 405—169 **11 Claims**



1. An apparatus for use in combination with subsea oil well drilling, completion, workover, and service systems and the such like which is located below the surface of a body of water having fluid conduit devices or receptacles, comprising:

a hydraulic stab sub with two or more seals for inserting into, sealing within, and commuicating fluid or gas to a receptacle comprising:

a body with a first face and a first seal means and a centerline,

a nose member with a second face and means for attaching to said body,

said first face and said second face being an axial distance apart when said nose is attached to said body,

a seal carrier with a second seal means capable of radial movement with respect to said centerline of said body, said seal carrier having an axial length less that said axial distance,

a third seal means sealing between said seal carrier and said nose during said radial movement such that when said seal carrier moves radially with respect to said body, sealing contact is maintained between said seal carrier and said nose,

such that said hydraulic stab sub can be inserted into said receptacle without precise alignment due to the ability of said second seal on said seal carrier to move radially with respect to said first seal on said body,

said hydraulic stab sub further comprising attachment means for the purpose of gripping by grippers on remotely operated vehicles or diver's hands,

said receptacle further providing guidance chamfers to facilitate the insertion of said hydraulic stab receptacle into said receptacle, and

said hydraulic stab receptacle provides guidance chamfers to facilitate insertion into said receptacle.

4,878,784

FEED CHUTE ARRANGEMENT FOR TEXTILE MACHINES, SUCH AS CARDING MACHINES

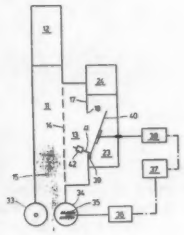
Rolf Binder, Schottikon; Paul Staeheli, Wilen b. Wil; Urs Staehli, Turbenthal, and Fritz Knabenhans, Winterthur, all of Switzerland, assignors to Rieter Machine Works Ltd., Winterthur, Switzerland

Continuation of Ser. No. 770,643, Aug. 28, 1985, abandoned. This application Dec. 28, 1987, Ser. No. 138,835

Claims priority, application Switzerland, Sep. 18, 1984, 04465/84

Int. Cl.[4] B65G *53/48, 53/66, 53/60*

U.S. Cl. 406—70 **6 Claims**



1. An arrangement for feeding fiber material to a textile machine, especially to a carding device, comprising:

a feed chute having a plurality of peripheral walls one of which is at least partially gas-permeable and together bounding an accumulation space having an open upper end for receiving the fiber material travelling through a transporting duct with a gaseous transportation medium and a lower end;

the fiber material accumulating in the feed chute to a predeterminate filling level in the form of a fiber body upon deposition from the transportation medium that leaves said accumulation space through said gas-permeable wall;

said gas-permeable part of said one peripheral wall, during operation of the feeding arrangement, being covered by said accumulated fiber material to an extent determined by the filling level of said accumulated fiber material;

a feeding roller pair arranged at said lower end of said accumulation space and operative for substantially continuously feeding the fiber material of said fiber body out of said accumulation space, during operation of the feeding arrangement;

means for bounding a gas output chamber in juxtaposition with said gas-permeable wall of said feed chute, including a wall different from said gas-permeable wall and having a gas output opening;

gas discharge means communicating with said gas output opening;

means for controlling the flow of the transportation medium into and through said accumulation space, said gas output chamber, and said gas discharge means, including a blocking flap movably mounted at said different wall for movement between a closed position in which it blocks said gas output opening so that supply of the fiber material into

said feed chute is stopped and a plurality of open positions in which it offers selected amounts of resistance to the flow of said transportation medium through said gas output opening to thereby control the density and the filling level of the fiber material accumulated in the form of a fiber body within the feed chute and to maintain such density and such filling level essentially within predeterminate limits; and

a weight connected to blocking flap and exerting a gravitational force thereon that results in a torque that urges said blocking flap toward said closed position thereof.

4,878,785

ABRASIVE FLUID FLOW

Roger A. Heron, Bedford, and David H. Saunders, Buckinghamshire, both of Great Britain, assignors to The British Hydromechanics Research Association, Bedford, England

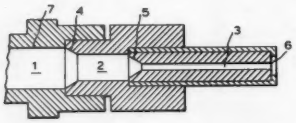
PCT No. PCT/GB86/00224, § 371 Date Dec. 10, 1986, § 102(e) Date Dec. 10, 1986, PCT Pub. No. WO86/06311, PCT Pub. Date Nov. 6, 1986

PCT Filed Apr. 24, 1986, Ser. No. 3,387

Claims priority, application United Kingdom, Apr. 25, 1985, 8510538

Int. Cl.[4] B65G *53/34*

U.S. Cl. 406—194 **14 Claims**



1. A nozzle for forming an abrasive fluid jet, comprising a fluid conduit having an inlet section of relatively large cross section into which an abrasive particulate material is to be introduced with a carrier fluid, flow deflector means mounted substantially centrally within said inlet section for deflecting the abrasive material outwardly toward the periphery of said inlet section, means comprising a first tapered section disposed down-stream from said inlet section for deflecting the abrasive material toward a central axis of said fluid conduit to form a core of the abrasive material surrounded by the carrier fluid, means comprising a second tapered section disposed downstream from said first tapered section for accelerating the carrier fluid, and means comprising an outlet section disposed down-stream from said second section for affecting an interchange of momentum between the accelerated carrier fluid and the abrasive material such that the abrasive material is accelerated to a high velocity.

4,878,786

TINE BIT

Virgil E. Hedgepeth, 704 Hillcrest Dr., Bradenton, Fla. 34209

Filed Sep. 21, 1988, Ser. No. 247,346

Int. Cl.[4] B23B *51/04*

U.S. Cl. 408—86 **15 Claims**

1. A drill bit for drilling a bore in stock material comprising:

an elongated main body member having a first, proximal end and a second, distal end;

said distal end having a central tine element mounted thereto,

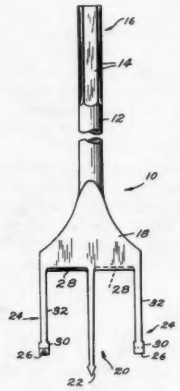
said central tine element including a shaft portion having a longitudinal axis parallel to a longitudinal axis of said main body member and having a pointed distal end.

said distal end of said central tine element having a maximum width greater than width of said shaft portion of said central tine element,

said distal end of said main body member further having at least one cutting tine element mounted thereto,

each said cutting tine element having a longitudinal axis parallel to the longitudinal axis of said central tine element and spaced therefrom,

each of said cutting tines having a shaft portion and a sharpened distal end defining a cutting blade.



said sharpened distal end of each said cutting tine element having a width greater than width of said shaft portion of said respective cutting tine element,

said distal end of said main body member further including a cutting blade defined between said central tine element and each of said cutting tine elements.

4,878,787

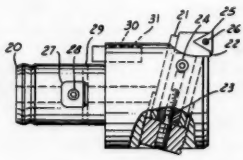
COARSE/FINE ADJUSTMENT BORING HEAD

Carl E. Hunt, Davisburg, Mich., assignor to GTE Valenite Corporation, Troy, Mich.

Filed Oct. 17, 1988, Ser. No. 258,345

Int. Cl.[4] B23B *29/034*

U.S. Cl. 408—181 **15 Claims**



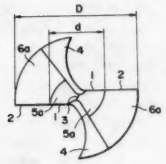
1. Coarse/fine adjustable boring head comprising a body having a transverse threaded bore, a through sleeve with externally threaded head adjustable within said bore to establish a coarse transverse adjustment for said sleeve, cutting tool cartridge means nonrotatably transversely adjustable within said sleeve to establish a fine transverse final boring diameter adjustment, unidirectional lead differential pitch threaded holes respectively in said head and an adjacent end of said cartridge means, and matching differential pitch screw means engaging respectively said threaded holes, whereby said sleeve may be coarse adjusted in single revolution external thread pitch increments, and said cartridge means may be fine adjusted relative to said sleeve through rotation of said differential screw in continuous whole or partial revolution increments.

4,878,788

DRILL FOR DRILLING A THIN PLATE

Koichiro Wakihira, Kobe; Michitaka Katsuta, Kakogawa; Masayasu Hino, Akashi, and Toshio Sasayama, Himeji, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Jan. 18, 1989, Ser. No. 298,015
Claims priority, application Japan, Aug. 4, 1988, 63-196397
Int. Cl.[4] B23B *51/02*
U.S. Cl. 408—230 4 Claims



1. A drill for drilling thin plates, having a pair of major cutting edges each of which comprises:

a tip;

an inner major cutting edge diagonally extending in a radially inner portion of the tip so as to form a protrusive leading part;

an outer major cutting edge extending in a radially outer portion of the tip;

a chisel edge formed at the junction of the pair of major cutting edges;

continuous flanks extending behind the inner major cutting edges and the outer major cutting edges, respectively, wherein:

the diameter of a circle scribed by the pair of inner major cutting edges is in the range of 40 to 50% of the drill diameter,

the point angle formed between the inner major cutting edges is in the range of 100° to 115°, and

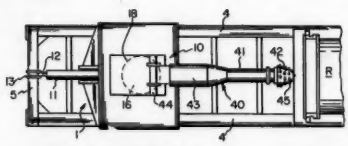
the outer corner angle corresponding to an angle formed between each outer major cutting edge and a plane perpendicular to the axis of the drill is in the range of 4° to 10°, wherein no margins are formed on the circumference of the tip and the circumference of the tip has a substantially circular shape.

4,878,789

APPARATUS FOR CLEANING TITANIUM POTS

Louis A. Grant, Pittsburgh, Pa., assignor to Louis A. Grant, Inc., Pittsburgh, Pa.

Filed Jul. 26, 1988, Ser. No. 224,794
Int. Cl.[4] B23C *3/00*
U.S. Cl. 409—143 8 Claims



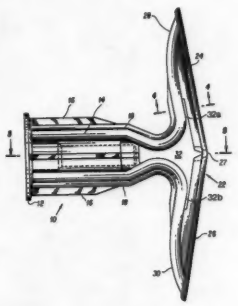
1. Apparatus for cleaning the inside of a metallurgical vessel comprising an inclined foundation having a lower end and a raised end, a mobile carriage having cleaning means carried thereon, support means on said inclined foundation for supporting said mobile carriage, said mobile carriage mounted on said support means and including means for permitting movement of said mobile carriage along said support means relative to said ends of said inclined foundation, means connected between said lower end of said foundation and said mobile carriage for moving said mobile carriage along said support means, said cleaning means including a pivotally mounted elongated boom having a rotary shaft with a distal end, a rotatable cutting head mounted on said distal end of said rotary shaft and drive means on said cleaning means for rotating said rotary shaft and said cutting head, means adjacent said raised end of said inclined foundation adapted to hold a metallurgical vessel in a stationary position during cleaning, whereby said rotatable cutting head is positioned within a stationary metallurgical vessel mounted in said means adjacent said raised end of said inclined foundation to contact the inner surface of a metallurgical vessel to remove material from the interior of the metallurgical vessel.

4,878,790

EXPANSIBLE FASTENING ELEMENT

Thomas W. McSherry, Stamford, Conn., and Nathaniel H. Garfield, Harrison, N.Y., assignors to Mechanical Plastics Corp., Pleasantville, N.Y.

Filed Apr. 2, 1985, Ser. No. 718,920
Int. Cl.[4] F16B *13/04*
U.S. Cl. 411—34 14 Claims



1. An expansible plastic fastener for securement within an aperture defined by structural means which comprises:

(a) a generally elongated body portion defining a generally central opening for reception of an elongated retaining element;

(b) a collar member formed integrally with one end of said body portion and having a flanged portion extending in a generally radially outward direction; and

(c) locking means connected to said body portion and movable between a collapsed position for insertion into such aperture and an expanded position in which said locking means prevents removal of the body portion out of such aperture by engagement of said locking means with said structural means beyond the edges of said aperture,

said locking means comprising a pair of substantially rigid toggle arms pivotally connected to said body portion and extending transversely with respect thereto in said expanded position, and wherein said pivotal connection permits said movement between said collapsed position, wherein said toggle arms move toward each other, and said expanded position, said toggle arms further being pivotally connected to each other by flexible integral strap means which intersects the central longitudinal axis of said body portion, with the flexible integral strap means being connected to the toggle arms at a distance from the central longitudinal axis such that the toggle arms are longitudinally spaced from the strap means,

said toggle arms each having an integrally formed plastic reinforcing rib integrally molded thereon, if a width less than the average width of the toggle arm and positioned generally centrally with respect to the width of said toggle arm and extending over a portion of said toggle

arm, parallel to said longitudinal spacing along a planar portion of said arm, and onto said body portion past said first mentioned pivotal connection, with said first mentioned pivotal connection being reinforced by said rib,

said toggle arms being pivotally movable toward and away from each other between respective collapsed and expanded positions with said reinforcing ribs assisting movements toward their expanded positions, while simultaneously contributing to their holding strength when said toggle arms are in said expanded position.

4,878,791

EXPANDING PLASTIC FASTENER

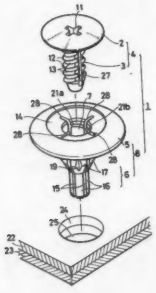
Kazumasa Kurihara, Utsunomiya; Seiji Takahashi, Hiroshima, and Yoshio Kaneko, Utsunomiya, all of Japan, assignors to Nifco Inc., Yokohama, Japan

Filed Oct. 19, 1988, Ser. No. 259,909

Claims priority, application Japan, Oct. 19, 1987, 62-261642; Oct. 20, 1987, 62-262580

Int. Cl.[4] F16B *13/04, 13/06*

U.S. Cl. 411—55 **4 Claims**



1. A plastic fastener, comprising a male member having a head and a pin-like portion having male threads, said pin-like portion depending from the lower surface of said head, and a female member having a flange facing said head of said male member, a leg portion depending from the lower end of said flange and a bore extending from the upper surface of said flange into said leg portion and capable of receiving said pin-like portion of said male member, said pin-like portion having a diametrically penetrating axial slot which extends in its intermediate portion, said leg portion of said female member having a plurality of axial grooves radially spaced apart around said bore and a plurality of spreadable portions each defined between adjacent ones of said axial grooves and having an upper end connected to the lower surface of said flange and a lower end connected to the lower ends of the other spreadable portions by hinge portions, said spreadable portions being adapted to be spread with the insertion of said pin-like portion into said bore, an upper portion of the inner periphery of said bore being formed with a helical ridge which makes a complete revolution along the inner periphery of said bore and is received in a thread groove defined between the male threads of said pin-like portion.

4,878,792

REMOVABLE MAT FASTENER

Frank G. Frano, Hoffman Estates, Ill., assignor to Illinois Tool Works, Inc., Chicago, Ill.

Filed Aug. 1, 1988, Ser. No. 226,772

Int. Cl.[4] F16B *21/00, 19/00*

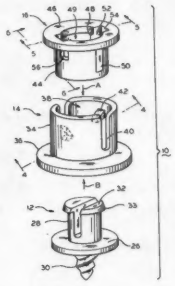
U.S. Cl. 411—339 **20 Claims**

1. A car-mat fastener for removably retaining a car-mat to a car carpet, said fastener comprising:

a latching post member consisting of a central flange separating an upper bifurcated post portion and a lower projecting portion, said lower projecting portion being adapted for fixed attachment to a car carpet, said post portion having a slightly enlarged head portion formed with an outer arcuate ridge;

a bottom latching ring-mat member consisting of a first bifurcated tubular-shaped section and a lower annular flange, said bottom latching member having a first axial opening for receiving a top latching ring-mat member, said first tubular-shaped section having diametrically opposed U-shaped slots and a pair of opposed tabs, said opposed tabs being formed on an inner surface of said first tubular-shaped section and being disposed perpendicularly to said U-shaped slots;

said top latching ring-mat member consisting of a second tubular-shaped section and an upper annular flange, said top latching member having an axial opening extending therethrough, said axial opening including a first aperture formed in said second tubular-shaped section and a second aperture formed in said upper annular flange defining a



radial shoulder therebetween, said second tubular-shaped section having diametrically opposed raised ribs extending longitudinally on its outer surface, said top latching member having a pair of opposed L-shaped cut-outs disposed perpendicularly to said raised ribs;

said second tubular-shaped section of said top latching member being telescoped into the first axial opening in the first tubular-shaped section of said bottom latching member so that said raised ribs mate with said U-shaped slots and said tabs are permanently secured into said L-shaped cut-outs, said top and bottom latching members sandwiching the car-mat between the upper and lower flanges and forming an eyelet therebetween; and

said post portion of said latching post member being inserted into said eyelet so as to cause the opposed sides thereof to be compressed by said second tubular-shaped section of said top latching member, said head portion being passed through the first aperture so that the arcuate ridge is allowed to become detachably engaged with said radial shoulder formed adjacent the second aperture.

4,878,793

SCREW THREADED FASTENER

George D. Hewison, Twyford, Great Britain, assignor to ITW, Ltd., Camberley, England

Filed Sep. 8, 1988, Ser. No. 241,891

Claims priority, application United Kingdom, Sep. 8, 1987, 8721048

Int. Cl.[4] F16B *23/00, 25/00*

U.S. Cl. 411—387 **7 Claims**

1. A screw threaded fastener, particularly intended for use in fastening corrugated sheet material to metal purlins, comprising:

a drilling point formed upon one end of said fastener;

a head portion formed upon an opposite second end of said fastener;

a first self-tapping screw threaded portion formed adjacent to said drilling point upon a first blank portion of said fastener having a first predetermined diameter;

a second screw threaded portion formed adjacent to said head portion upon a second blank portion of said fastener having a second predetermined diameter which is greater than said first predetermined diameter of said first screw threaded portion;

an unthreaded portion interposed and extending between said first and second screw threaded portions and having a diametrical extent which is substantially equal to said diameter of said second blank portion of said second screw threaded portion of said fastener and which is there-

fore greater than said diameter of said first blank portion of said first screw threaded portion;

a transition portion interposed between said first screw threaded portion and said unthreaded portion for smoothly interconnecting said first screw threaded portion, having said first predetermined diametrical extent, with said unthreaded portion having said second predetermined diametrical extent; and

forming means formed upon said transition portion and projecting substantially radially outwardly from external surface portions of said transition portion for enlarging the diameter of a hole drilled within said sheet material by said drilling point so as to facilitate the passage of said unthreaded and second screw threaded portions through said sheet material.

4,878,794

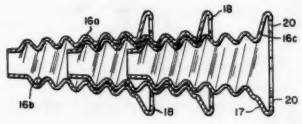
COLLATED SCREW FASTENERS

Frank R. Potucek, Palmetto, Fla., assignor to John W. Hall, Jr., Savannah, Ga.

Filed Mar. 15, 1988, Ser. No. 168,310

Int. Cl.[4] F16B *35/00, 35/04*

U.S. Cl. 411—395 **14 Claims**



1. A fastener means, comprising:

an elongate, hollow, tubular screw member having a head and a shank;

said shank having a proximal end contiguous to said head and a distal end terminating in an annular opening;

said shank being tapered along its extent;

said annular opening having a diameter less than the inner diameter of said shank proximal end;

a plurality of helical ribs being formed along the extent of said shank;

an annular overhang being defined by a difference in diameter between said head and the proximal end of said shank;

said helical ribs forming interior thread means and exterior thread means along the extent of said shank; and

the interior thread means of about a top half of a first screw member screw threadedly receiving about a lower half of the exterior thread means of a second screw member of like size when said first and second screw members are disposed in a nesting relationship with one another.

4,878,795

BUSH HAVING A RADIALLY ENLARGED FLANGE

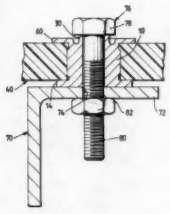
Michael Woodrow, Welwyn Garden City, and Raymond D. Lacey, Essendon, both of England, assignors to Avdel Systems Limited, Welwyn Garden City, England

Filed Nov. 4, 1988, Ser. No. 267,300

Claims priority, application United Kingdom, Nov. 11, 1987, 8726363

Int. Cl.[4] F16B *19/08, 37/04*

U.S. Cl. 411—501 **7 Claims**



1. A bush comprising:

a generally cylindrical body;

a radially enlarged flange extending from adjacent one axial end of said body for abutting one face of a workpiece;

an axial bore extending through said cylindrical body and said flange; and

a tail portion extending axially from an end of said body opposite said flange whereby said body defines an intermediate portion between said flange and said tail portion, wherein said tail portion comprises:

(a) an annular boss extending axially from said opposite end of said body, said axial bore extending through said annular boss so that said annular boss surrounds said axial bore, and

(b) a deformable annular skirt extending axially from said opposite end of said body by a distance greater than the axial length of said boss, said skirt surrounding said annular boss with an annular gap therebetween,

wherein the axial length of said boss is greater than the radial thickness of said skirt, whereby said annular skirt may be deformed to extend radially of said intermediate portion and form a second radially enlarged flange at said opposite end of said body when said intermediate portion is inserted through the workpiece and said annular boss extends axially beyond said deformed annular skirt.

4,878,796

CONVEYING APPARATUS FOR LOADING AND UNLOADING GOODS, IN PARTICULAR FOR USE WITH SHIPS

Thomas C. M. Ammeraal, Zandweg 115, 1531 An Wormer, Netherlands

Filed Feb. 29, 1988, Ser. No. 162,162

Claims priority, application Netherlands, Mar. 3, 1987, 8700511

Int. Cl.[4] B65G *67/60*

U.S. Cl. 414—141.7 **19 Claims**

1. Conveying apparatus for loading and unloading goods, in particular for use with ships, comprising

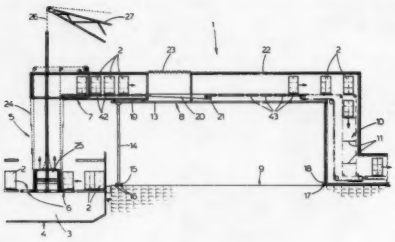
a frame;

a conveyor supported by the frame and being covered by a first encasement means;

a cage lift provided with a lower loading and unloading point and an upper loading and unloading point connected to the conveyor, the cage lift comprising a substantially

vertical lift shaft having a second encasement means and guiding means extending substantially vertically;

a lift cage for conveying the goods, the cage being guided by the guiding means within the lift shaft and having a floor for carrying the goods, the floor being adapted to be



opened in order to enable goods packed in slings and hoisted into or out of a ship's hold to pass through the lift cage;

hoisting means connected to the lift cage for displacing the lift cage up and down within the lift shaft.

4,878,797

METHOD AND APPARATUS FOR CORRECTING THE FALLING PATH IN A LOADING INSTALLATION OF A SHAFT FURNACE

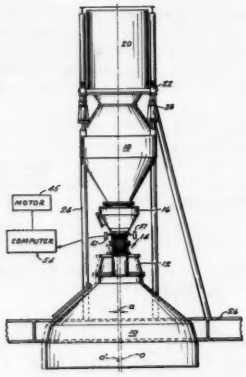
Emile Lonardi, L-Bascharage, Luxembourg, assignor to Paul Wurth S.A., Luxembourg

Filed Mar. 16, 1988, Ser. No. 168,926

Claims priority, application Luxembourg, Mar. 24, 1987, 86.822

Int. Cl.[4] F23K *3/00*

U.S. Cl. 414—161 **9 Claims**



3. Apparatus for correcting the falling path of charge material in a loading installation of a shaft furnace in order to compensate for the random movements and inclinations of the shaft furnace whereby the central axis of the shaft furnace deviates from an initial reference axis 0 comprising:

a storage lock chamber supported on a framework, said framework being independent of the shaft furnace;

compensator means connecting said storage lock chamber to the head of the shaft furnace;

detector means for detecting lateral shifting of the head of the shaft furnace in relation to said lock chamber to determine the shifted central axis 0'of the furnace; and

inclining means for inclining said storage lock chamber until the axis of the falling path of charge material corresponds to said shifted central axis 0'of the shaft furnace.

4,878,798

BOX HANDLING APPARATUS

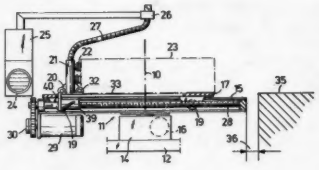
Lennart Johansson, Mjölby, Sweden, assignor to BT Industries AB, Mjolby, Sweden

Filed Nov. 3, 1987, Ser. No. 117,013

Claims priority, application Sweden, Nov. 3, 1986, 8604691

Int. Cl.[4] B66C *9/18*

U.S. Cl. 414—280 **7 Claims**



1. Apparatus for handling boxes stored in shelf compartments of a storage shelving system, comprising:

a body structure adapted to be carried by a materials-handling vehicle, said body structure being movable to a given vertical level by a lifting means provided on said vehicle, so as to be in registration with a respective shelf compartment of the storage shelving system;

a box support table on said body structure and being movable along said body structure by means of a box dogging device;

said box dogging device being arranged for dogging movement along said body structure with a drive means for dogging respective boxes between said box support table and said respective shelf compartment;

said box dogging device including a plurality of suction cups commonly mounted on a carrier device which is mounted on said box dogging device, and vacuum means coupled to said suction cups, said suction cups being arranged for engagement with a side of a box when said vacuum means is activated;

guiding means provided on said body structure and on which said box support table is movable between an inner and outer terminal position;

said box support table comprising a substantially flat supporting plate having a substantially flat slide surface on which boxes are displaceable by means of said box dogging device, said substantially flat plate having an elongated opening therein;

said box dogging device with said carrier device extending through said elongated opening in said substantially flat plate, the linear extension of said elongated opening being shorter than the length of a full working stroke of said box dogging device so that said box dogging device by engaging a respective end surface of said elongated opening prior to the box support table reaching its respective terminal position also moves said substantially flat plate therewith.

4,878,799

AUTOMATIC MACHINE FOR UNLOADING FILM SHEET FROM MAGAZINE

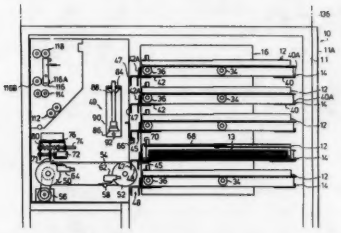
Izumi Seto; Mikio Tsuyuki, and Yutaka Takashima, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 7, 1988, Ser. No. 141,395

Claims priority, application Japan, Jan. 7, 1987, 62-668[U]; Mar. 17, 1987, 62-62308

Int. Cl.[4] B65G *65/00*

U.S. Cl. 414—331 **26 Claims**



1. An automatic machine for unloading film sheets from any of a plurality of magazine, said machine comprising:

a plurality of movable trays, each of which is loaded with one of said magazines containing film sheets;

an elevator for moving said movable trays to locate a selected one of said magazines to a retracted position from which said selected magazine is capable of being moved to a film unloading position where the film sheets can be unloaded from said selected magazine;

a film unloading preparation means including tray driving means operable for driving the movable tray which loads said selected magazine to move it between said retracted position and said film unloading position and engaging means disposed between each of said movable trays and said tray driving means and having a portion connected to said movable trays, said engaging means comprising a hook and an insert member disposed on said tray driving means for movement during operation of said tray driving means to a position for engaging said hook to transmit a driving force of the tray driving means to the movable tray which loads said selected magazine, said portion of said engaging means connected to said movable trays having a notch opening defined therein for allowing said tray driving means to pass through said notch opening during movement of said movable trays by said elevator; and

a film unloading mechanism for unloading the film sheet from said selected magazine located at said film unloading position.

4,878,800

PORTABLE UNLOADING PLATFORM AND RAMP

Travis E. Dell, 2609 N. Ellis Loop Rd., Plant City, Fla. 33566

Filed Mar. 15, 1988, Ser. No. 168,245

Int. Cl.[4] B65G *67/00*

U.S. Cl. 414—401 **16 Claims**

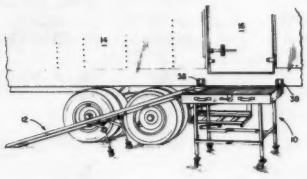
1. In combination, a platform and ramp for loading or unloading of a semi-trailer, said combination comprising:

a platform, said platform including legs extendable between a retracted and an extended position,

first carrier means mounted on the bottom of said semi-trailer for removably securing said platform beneath the bottom of said semi-trailer,

a ramp, said ramp including legs extendable between a retracted and an extended position, and

second carrier means mounted on the bottom of said semi-trailer for removably securing said ramp beneath the bottom of said semi-trailer, said second carrier means including a fixed mounting bracket and a swivel turntable spaced from one another for holding the ends of said ramp,



said fixed mounting bracket and said swivel turntable being located on opposite sides of said first carrier means,

said swivel turntable including a pivotable bracket for receiving a top end of said ramp at variable angles during loading of said ramp into said second carrier means.

4,878,801

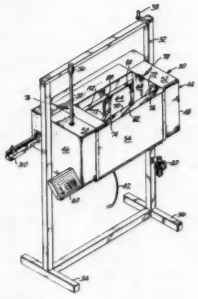
MACHINE FOR HANDLING CIRCUIT PACKAGE STORAGE TUBES

Rune S. Pearson, Torrance, Calif., assignor to Invention Design Engineering Associates, Inc., Torrance, Calif.

Continuation of Ser. No. 864,723, May 19, 1986, abandoned. This application May 2, 1988, Ser. No. 191,720

Int. Cl.[4] B65B *69/00*

U.S. Cl. 414—411 **12 Claims**



1. A machine for handling elongated storage tubes capable of holding components in a uniform and substantially fixed position with respect to at least one rotational axis of the components within individual tubes, comprising:

a bin for holding the tubes in a substantially known longitudinal position, the bin including means for moving tubes to a substantially known lateral position;

a gripping means comprising a pair of opposed gripping fingers, the gripping fingers being slidably affixed at opposite ends of the bin and being inwardly moveable for grasping the opposite ends of an individual tube;

automated means for lowering the gripping fingers toward the substantially known lateral position until the gripping fingers contact an individual tube in the bin, and for moving the gripping fingers to grasp the ends of the contacted tube and lift it from the bin; and

automated means for rotating the tube, after it has been lifted from the bin, about its longitudinal axis to a desired rotational position determined by reference to an indexing means on the tube related to the position of components

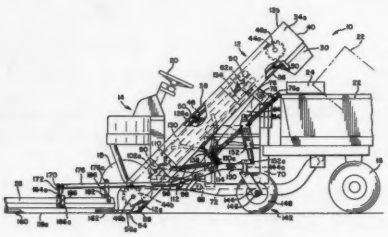
held in the tube, whereby components with a substantially known orientation can be fed to and from the tube.

4,878,802

MACHINE FOR COLLECTING GROUND PARTICLES AND THE LIKE

Loren F. Hansen, Lincoln; Donald J. Huber, deceased, late of Lincoln (by Lisa A. Huber, beneficiary), and Joseph J. Oliver, Lincoln, all of Nebr., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed Feb. 26, 1988, Ser. No. 160,617
Int. Cl.[4] B65G *65/02*
U.S. Cl. 414—523 **15 Claims**



1. A machine for gathering particles from a ground surface and the like and being attachable to a self-propelled vehicle, comprising, in combination,

an upwardly inclined conveyor operative to receive particles at a lower receiving end and convey the particles longitudinally of the conveyor to an upper discharge end,

gathering means cooperative with said lower receiving end of said conveyor for guiding particles disposed on the ground surface to said receiving end of said conveyor as the machine traverses the ground surface,

and means supporting said conveyor on the vehicle in an upwardly inclined orientation, said support means including a truss frame arrangement having ball joint means supporting said conveyor for rotation substantially about its longitudinal axis in response to changes in surface contour so as to enable said conveyor and gathering means to maintain a predetermined operating orientation to the ground surface, said truss frame arrangement including linkage means enabling an operator to raise said conveyor above the ground surface to a non-operating position for transport, said truss frame arrangement including a substantially parallelogram linkage arrangement having a pair of pivot arms supported for pivotal movement about discrete parallel pivot axis and having cantilevered support arms defining said ball joint means which are cooperative with said conveyor so as to enable rotation of said conveyor substantially about its longitudinal axis.

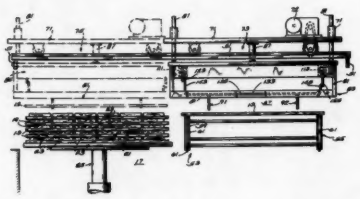
4,878,803

STICK DELIVERY APPARATUS

Wade Q. Whiddon, P.O. Box 31, Abbeyville, Ala. 36310

Filed Mar. 11, 1988, Ser. No. 167,024
Int. Cl.[4] B65G *57/18*
U.S. Cl. 414—789.5 **13 Claims**

12. Apparatus for delivering separator sticks to a stacking station, said apparatus comprising a frame, a stick conveyor supported on said frame for movement between a stick supply station and a stick transfer station horizontally spaced from the stick supply station and from the stacking station and including means for transporting sticks from the supply station and for delivering to the transfer station a plurality of the sticks in a predetermined spaced and parallel relation to one another, means on said frame adjacent said transfer station for lifting the predetermined plurality of sticks in the predetermined spaced and parallel relation to one another from said conveyor to a raised position above said conveyor, carriage means supported on said frame for movement relative to said frame between a pick-up position adjacent the transfer station and a delivery position horizontally spaced from the pick-up station and adjacent the stacking station, and means on said carriage means and movable in common therewith for engaging the predetermined plurality of sticks in the predetermined spaced and parallel



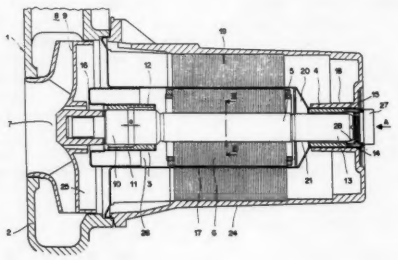
relation to one another when the sticks are located in the raised position and when said carriage means is in the pick-up position, for retaining the predetermined plurality of sticks in the predetermined spaced and parallel relation to one another during carriage means movement from the pick-up position to the delivery position and for releasing the predetermined plurality of sticks in the predetermined spaced and parallel relation to one another at the stacking station when said carriage mean sis in the delivery position.

4,878,804

CIRCULATING PUMP

Paul Akerman, Münsingen, and Wolfram Meyer, Hilterfingen, both of Switzerland, assignors to Bieri Pumpenbau AG, Sudstrasse, Switzerland

Filed Sep. 12, 1988, Ser. No. 242,486
Claims priority, application Switzerland, Sep. 15, 1987, 3553/87
Int. Cl.[4] F04D *29/06*
U.S. Cl. 415—111 **5 Claims**



1. A circulating pump, especially for hot-water plants, of the type having a pump housing, at least two bearing bushes, a shaft mounted between the bearing bushes, a rotor provided with longitudinal grooves mounted on the shaft, a stator, a fluid-tight sleeve disposed between the rotor and the stator, and an impeller connected to the shaft, wherein the improvement comprises:

at least one baffle plate having a center aperture encircling said shaft between said rotor and one of said bearing bushes, the diameter of said aperture being slightly greater than the diameter of said shaft, whereby a gap is formed between said shaft and said baffle plate, and

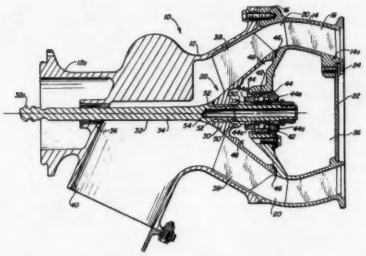
at least one lubrication groove disposed in each of said bearing bushes.

4,878,805

BLOWER FOR USE IN PARTICLE CONTAMINATED ENVIRONMENTS

Behzad Hagshenas, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Oct. 20, 1988, Ser. No. 260,036
Int. Cl.[4] F01D *25/32*
U.S. Cl. 415—169.1 **12 Claims**



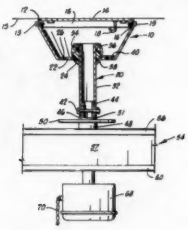
5. In a blower for use particularly in environments of particle contamination, the blower including impeller means rotatably mounted in housing means by bearing means between two cavities on opposite sides of the bearing means for drawing the particle contaminated air from an inlet of housing means, the improvement comprising passage means communicating between said cavities to provide a pressure balance therebetween and thereby prevent particle contaminates from infiltrating the bearing means.

4,878,806

DUAL MOUNTING CEILING FAN

Herbert W. Markwardt, Fort Worth, Tex., assignor to Encon Industries, Inc., Fort Worth, Tex.

Continuation-in-part of Ser. No. 913,475, Mar. 8, 1988, Pat. No. 4,729,725. This application Mar. 4, 1988, Ser. No. 164,098
Int. Cl.[4] F04D *29/64*
U.S. Cl. 416—5 **3 Claims**



1. A ceiling fan adapted for selective mounting flush to the ceiling in a flush mounting mode, or alternatively, suspended by a down rod in a down rod mounting mode, comprising:

a horizontally extending ceiling mounting plate having a downwardly extending flange, said flange defining a plurality of screw holes therethrough;

a concavo-convex canopy having screw holes therethrough and including a centrally apertured lower central plate, said lower central plate having a plurality of upper fastener holes formed therethrough in spaced array about the aperture through the center of said central plate;

a plurality of mounting screws extending through said screw holes in the canopy and into engagement with the screw holes in the downwardly extending flange of the ceiling mounting plate;

a J-hook projecting down from the ceiling mounting plate from a location within the downwardly extending flange and having a canopy-suspending point thereon of a size to pass through the screw holes in the canopy and facilitating hanging of the canopy therefrom to effect electrical connections to the fan;

a down rod assembly removably connected to the canopy and projecting downwardly therefrom, said down rod assembly including:

an elongated tubular down rod having an upper end extending through the central aperture in said lower central plate and having a lower end;

a ball element secured to the upper end of said down rod and adapted to land on the lower central plate for swivelly supporting said down rod suspended from said canopy when said fan is mounted in said down rod mounting mode;

anti-rotation means on the ball element and the central plate for preventing rotation of the ball element relative to the canopy; and

a down rod sleeve telescopingly receiving the lower end of said down rod and sized to project through the aperture in the lower central plate of said canopy when said fan is mounted in said flush mounting mode;

a fan motor housing carried by said down rod sleeve;

a flush mounting plate carried with the fan motor housing and having a plurality of lower fastener holes therethrough vertically aligned with said upper fastener holes in said central plate of said canopy; and

means for interengaging said lower central plate of said canopy in flat abutting contact with said flush mounting plate with said down rod sleeve projecting into said canopy through the central aperture in said lower central plate at a time when the down rod and ball element are removed to facilitate flush mounting of the fan, said interengaging means comprising a plurality of fasteners removably carried in said lower fastener holes through said flush mounting plate, and sized to pass through the upper fastener holes in said central plate of said canopy.

4,878,807

RELATING TO ENERGY CONVERSION APPARATUS

Keith G. Baker, 210 Linden Ave., Rutledge, Pa. 10970

Filed Mar. 28, 1988, Ser. No. 174,037
Int. Cl.[4] F03D *5/04*
U.S. Cl. 416—7 **11 Claims**

1. Energy conversion apparatus which comprises:

a rigid structural frame;

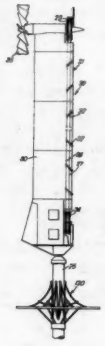
endless belt circulating means supported by the said structural frame;

endless belt means mounted on said endless belt circulating means for movement thereon;

a multiplicity of generally planar hydrodynamic lift members spaced apart at intervals along, and mounted on and laterally offset from the said endless belt means for pivotal movement of said lift members about an axis outside of and parallel to the plane of said lift members; and

load means having a rotary part coupled to the said endless belt means, the arrangement of the several parts being

such that lift forces are developed acting on the said lift members as a result of passage of fluid thereacross, such



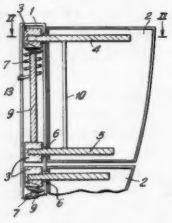
lift forces being transmitted to the said belt means so as to cause motion thereof about the said circulating parts.

4,878,808

AIRFOIL FOR A WIND-DRIVEN WHEEL

Anton Wildenauer, Auf dem Wingert 3, 6101 Rossdorf, Austria

Filed May 4, 1988, Ser. No. 189,988
Claims priority, application Austria, May 14, 1987, 1223/87
Int. Cl.[4] F03D 7/04
U.S. Cl. 416—132 B **9 Claims**



1. An airfoil for a wind-driven wheel rotatable about a horizontal axis for utilizing wind energy, comprising:

a spar connected with the axis of the wheel and having a longitudinal side;

at least one vane provided at the longitudinal side of the spar;

at least one pivot bearing located inside the spar;

a return spring provided so as to press the vane into a neutral position; and

at least one web provided so as to connect the at least one vane with the at least one pivot bearing, the web being arranged so as to pass through an aperture in the longitudinal side of the spar.

4,878,809

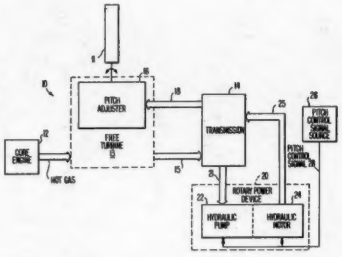
POWER SOURCE AND CONTROL MECHANISM FOR PROPELLER PITCH CONTROL

John E. Ames, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Jul. 5, 1988, Ser. No. 215,356
Int. Cl.[4] B64C 11/32
U.S. Cl. 416—151 **21 Claims**

1. A pitch controller for varying a pitch of a plurality of blades in a fan powered by a turbine, the pitch controller comprising:

pitch adjusting means having an input means for controlling the pitch of the blades, the pitch of the blades being constant in response to a rotational velocity of the input means and a rotational velocity of a power source means for applying rotary power to the blades having a constant ratio, and the pitch of the blades changing in response to the rotational velocity of the input means and the rotational velocity of the power source means changing in ratio;



a transmission means having a first input means from the power source means for applying rotary power and a second input means for controlling a rotational velocity of a first output means in proportion to a change in velocity of the second input means, and a second output means; and

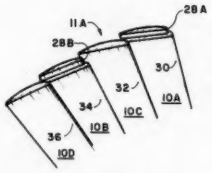
means for providing the input from the second input means to the transmission means, the rotational velocity of the second input from the second input means to the transmission means varying in proportion to a change in an applied pitch control signal for controlling the pitch of the blades, the output from the first output means of the transmission means providing torque to the pitch adjusting mean to control an adjustment of pitch of the blades.

4,878,810

TURBINE BLADES HAVING ALTERNATING RESONANT FREQUENCIES

David H. Evans, Lake Mary, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 20, 1988, Ser. No. 196,691
Int. Cl.[4] F01D 5/10
U.S. Cl. 416—203 **6 Claims**



1. A steam turbine rotor assembly comprising:

a rotor rotatable at a predetermined running speed,

a plurality of first free standing elongated, low aspect rotor blades, each having a first resonant frequency,

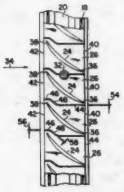
a plurality of second free standing elongated, low aspect rotor blades, each having a second resonant frequency, wherein the plurality of first and second rotor blades are alternatingly connected to the rotor in at least one row, and wherein adjacent blades of the at least one row have

alternating first and second resonant frequencies, each of the plurality of first and second rotor blades having a base portion and an air foil portion including a leading edge, a trailing edge, a concave surface, a convex surface, and a tip, and the tips of the plurality of second rotor blades of the at least one row being profiled for increasing the resonant frequency thereof, said alternating first and second resonant frequencies providing means for preventing unstalled flutter in the at least one row at non-resonant frequencies wherein each profiled tip includes an L-shaped recess formed substantially longitudinally from the leading edge to the trailing edge in the concave surface of the airfoil portion of the blade at the tip, said L-shaped recess defining an extension running from the trailing edge along the top and terminating before the leading edge.

4,878,811
AXIAL COMPRESSOR BLADE ASSEMBLY

Stephen W. Jorgensen, West Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 14, 1988, Ser. No. 270,994
Int. Cl.[4] F01D *5/22*
U.S. Cl. 416—215 **7 Claims**



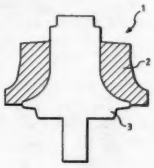
1. A bladed drum type compressor assembly comprising:
a plurality of disks each having a rim with a circumferential blade root retention slot therein;
a plurality of blades installed in each slot, each blade having an airfoil, a blade platform supporting said airfoil, and a root supporting said blade platform;
said blade roots retained within said slots with said airfoils in high solidity relationship with each other;
each blade platform having two circumferentially oriented ends, a first major axial edge portion adjacent a first end and substantially perpendicular to said first end,
a second minor axial edge portion adjacent to the second end and substantially perpendicular to said second end, a canted intermediate edge portion intermediate said first and second axial edge portions; and
said plurality of blades assembled with the minimum clearance between adjacent platforms occurring between said first major portions as compared to said second minor portions and said canted intermediate portions.

4,878,812
TURBINE ROTOR

Tomohisa Kito; Katsuhisa Yabuta, and Yoshinori Hattori, all of Aichi, Japan, assignors to NGK Spark Plug, Co., Ltd., Aichi, Japan

Filed Jun. 3, 1988, Ser. No. 201,722
Claims priority, application Japan, Jun. 5, 1987, 62-141271
Int. Cl.[4] F01D *5/28*
U.S. Cl. 416—241 B **1 Claim**

1. In a turbine rotor having a ceramic turbine wheel, wherein the improvement comprises said ceramic turbine wheel being made of a material having pores having a maximum diameter of 20 μm distributed in a blade portion of said turbine wheel at a porosity of 2 to 10 vol. % and wherein the

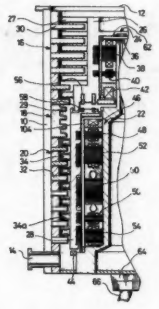


volume porosity of said pores gradually decreases from a blade surface of said blade portion to an inside thereof.

4,878,813
VACUUM PUMP

Masaharu Miki, Narashino, Japan, assignor to Seiki Seiki Kabushiki Kaisha, Japan

Filed Mar. 9, 1988, Ser. No. 165,719
Claims priority, application Japan, Mar. 18, 1987, 62-63282
Int. Cl.[4] F04B *23/04, 37/14*
U.S. Cl. 417—2 **11 Claims**



1. A pump for producing ultra high vacuum comprising: a housing; a first rotor within said housing having a first set of rotor blades disposed around said first rotor for coaxial with said first rotor within said housing producing ultra high vacuum; a second rotor having a second set of rotor blades disposed around said second rotor for producing relatively low to high vacuum; ;magnetic suspension means for magnetically suspending said first rotor and said second rotor for rotation with said housing; a motor for rotationally driving at least said second rotor; and magnetic clutch means for coupling said first rotor and said second rotor when a predeterminined level of vacuum is reached.

4,878,814
VARIABLE CAPACITY COMPRESSOR WITH CAPACITY-INDICATING DEVICE

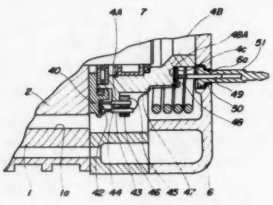
Nobuyuki Nakajima; Kenichi Inomata; Masaya Moruta; Toshio Yamaguchi, and Kazuo Eitai, all of Konan, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Oct. 31, 1988, Ser. No. 257,980
Claims priority, application Japan, Nov. 5, 1987, 62-280134
Int. Cl.[4] F04B *21/00, 39/00, 49/02*
U.S. Cl. 417—63 **10 Claims**

1. A variable capacity compressor including pumping means, a suction chamber for supplying said pump means with low pressure, a discharge pressure chamber supplied with high pressure from said pumping means, and a control element the position of which changes in response to a difference between

low pressure from said suction chamber and high pressure from said discharge pressure chamber to determine the capacity of said pumping means, which comprises:

detector means for detecting change in the position of said control element in a continuous manner and having an output commensurate with said change; and



capacity-indicating means for visually indicating an output value thereof in a manner continuously variable in response to a continuous change in said detector means output, whereby the output value visually indicated by said capacity-indicating means varies continuously with a continuous change in the capacity of said pumping means.

4,878,815

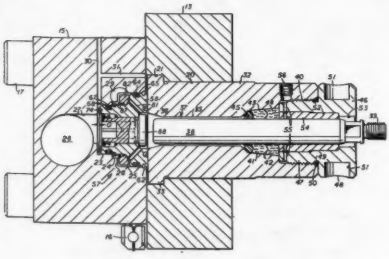
HIGH PRESSURE RECIPROCATING PUMP APPARATUS

J. Edward Stachowiak, P.O. Box 79731, Houston, Tex. 77024

Filed May 18, 1988, Ser. No. 195,689

Int. Cl.[4] F04B *21/02;* **F16J** *10/02, 15/24;* **F16K** *15/00*

U.S. Cl. 417—63 **43 Claims**



1. In a high pressure reciprocating fluid pump including a pump drive housing having at least one reciprocating plunger extendable out of one end thereof;

a mounting plate secured to said drive housing plunger end having a first face perpendicular to the axis of said plunger in contact therewith and a second, parallel face with at least one bore extending therethrough in axial alignment with said plunger,

stuffing box means releasably received in said mounting plate bore and having one end extending into said pump drive housing and a central bore slidably receiving one end of said plunger,

packing means surrounding said plunger in reciprocal sealing relation

a pressure chamber in said stuffing box means at the opposite end of said central bore coaxial with said plunger,

suction and discharge manifold means comprising block means secured on said mounting plate second face and having at least one interior cavity substantially coaxial with said stuffing box means central bore and having suction and discharge manifolds therein opening into the end of said cavity opposite said plunger, and

a unitary suction and discharge valve cartridge assembly in said manifold means interior cavity abutting said stuffing box means and aligned with said plunger and said pressure chamber, and including a suction valve and a discharge valve movably mounted on a common seat member to control fluid flow into and out of the end of said cavity.

35. A suction and discharge valve cartridge assembly for installation in a valve manifold apparatus having at least one valve cavity in communication with suction and discharge port passageways and the manifold apparatus of the type used in a high pressure reciprocating fluid pump having a pump drive housing and at least one reciprocating plunger extending through stuffing box means, the valve cartridge assembly comprising;

a generally cylindrical seat member having a central bore extending therethrough,

a suction valve seat surface and a discharge valve seat surface concentric and radially spaced relative to one another,

a suction valve member and a discharge valve member movably mounted on said seat member relative to said suction valve seat surface and said discharge valve seat surface respectively,

said suction valve and said discharge valve members positioned concentric and radially spaced relative to one another on said seat member and coaxial with the seat axis, and

said suction valve having a surface opposite said seat surface substantially coplanar with one end of said cylindrical seat member.

4,878,816

IN-TANK FUEL RESERVOIR WITH FUEL VAPOR SEPARATION

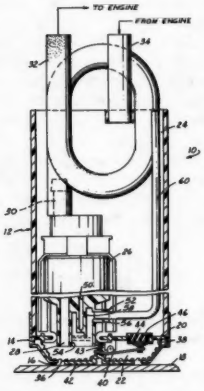
Charles H. Tuckey, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.

Continuation-in-part of Ser. No. 153,316, Feb. 8, 1988, Pat. No. 4,831,990, which is a continuation-in-part of Ser. No. 49,537, May 14, 1987, Pat. No. 4,807,582, which is a continuation-in-part of Ser. No. 928,184, Nov. 7, 1986, Pat. No. 4,747,388. This application Jun. 2, 1988, Ser. No. 201,633

The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.

Int. Cl.[4] B60K *15/02;* **F04F** *5/02*

U.S. Cl. 417—76 **5 Claims**



1. A fuel delivery system for automotive engines and the like comprising:

a canister for positioning within a fuel tank and having a lower end with an opening and means forming an internal

wall spaced from said lower end and dividing said canister into upper and lower canister chambers,

an electric-motor fuel pump positioned within said upper chamber having a fuel inlet extending through said wall into said lower chamber, a primary fuel outlet for feeding fuel under pressure to an engine and a secondary fuel outlet for supplying fuel under pressure, and

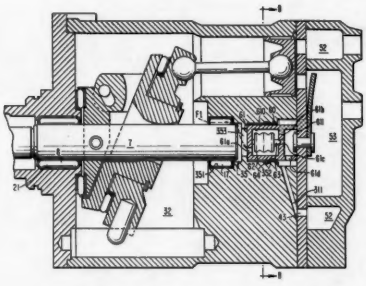
a glad extending through said wall from said pump to said lower chamber, said glad including passages forming said pump fuel inlet, fluid conduit means extending through said wall in parallel with said inlet passage and having an inlet end in said lower chamber adjacent to a lower end of said pump fuel inlet passage and an outlet end positioned in said upper chamber, and nozzle means coupling said pump secondary outlet to said fluid conduit means for aspirating vapor and fuel through said fluid conduit means from said lower chamber to said upper chamber.

4,878,817

WOBBLE PLATE TYPE COMPRESSOR WITH VARIABLE DISPLACEMENT MECHANISM

Sei Kikuchi; Kiyoshi Terauchi, both of Isesaki; Kazuhiko Takai, Maebashi, and Teruo Higuchi, Isesaki, all of Japan, assignors to Sanden Corporation, Gunma, Japan

Filed Feb. 22, 1988, Ser. No. 158,711
Claims priority, application Japan, Feb. 20, 1987, 62-35910
Int. Cl.[4] F04B *1/26*
U.S. Cl. 417—222 S **21 Claims**



1. In a slant plate type compressor with a variable displacement mechanism, the compressor comprising a compressor housing having a central portion, a front end plate at one end and a cylinder head provided with a suction chamber and a discharge chamber at its other end, said housing having a cylinder block provided with a plurality of cylinders and a crank chamber adjacent and cylinder block, a piston slidably received within each of the cylinders, a drive shaft rotatably supported in the housing, said cylinder block having a central bore rotatably supporting one end of the drive shaft, a rotor coupled to the drive shaft and rotatably therewith, coupling means for drivingly coupling said rotor to said pistons such that the rotary motion of said rotor is converted into reciprocating motion of said pistons, said coupling means including a member having a surface disposed at an incline angle relative to the longitudinal axis of the drive shaft, and control means for controlling fluid communication between the crank chamber and the suction chamber to vary the angle of said member, the stroke length of said pistons and the capacity of the compressor, the improvement comprising:

said control means being disposed in said central bore of said cylinder block adjacent said one end of said drive shaft, said control means including a control valve; and

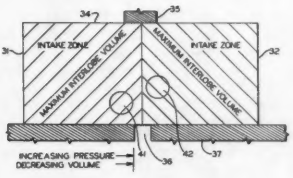
a conduit in said cylinder block extending from said central bore through said cylinder block to the suction chamber.

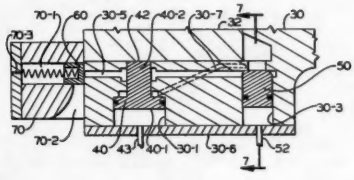
4,878,818

COMMON COMPRESSION ZONE ACCESS PORTS FOR POSITIVE DISPLACEMENT COMPRESSOR

David N. Shaw, Manlius, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Jul. 5, 1988, Ser. No. 214,974
Int. Cl.[4] F04B *49/02*
U.S. Cl. 417—308 **16 Claims**





1. A method for operating a positive displacement compressor of the type where trapped volumes are established and moved relative to fixed structure as part of a compression cycle comprising the steps of:

providing at least one port in the fixed structure at a location having fluid communication with a trapped volume during a portion of its compression cycle;

blocking the one port when full output of the compressor is desired;

establishing communication between a trapped volume and the inlet to the compressor via the one port when it is desired to unload the compressor; and

establishing communication between a trapped volume and the discharge to the compressor via the one port when it is desired to reduce the discharge pressure to suction pressure ratio.

4,878,819

OTR SAFETY URINAL PUMPS

Edward Bozoyan, 1812 West St., Union City, N.J. 07087

Filed Apr. 14, 1988, Ser. No. 181,507
Int. Cl.[4] F04B *7/00*
U.S. Cl. 417—514 **6 Claims**

1. A pouring liquid pumping device connected to an actuating means, to a discharge and disinfectant means, said pump having an "at rest" position, an intake cycle and a pumping cycle; said device comprising:

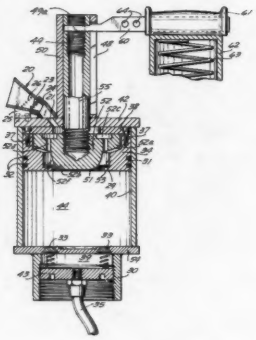
pressure chamber means having a pump cylinder provided with a lower plate having a valved outlet opening,

and having with an upper plate having a central opening and an intake opening;

piston means having a composite piston, said piston having a face on a lowermost surface of the piston with a central opening on said face forming a valve seat; having an interior chamber with an interior shelf and an annular lid covering said interior chamber;

a central and normally open inlet valve operatively disposed inside said piston's interior chamber, said valve having

(a) a valve head adapted to engage with and to seal said valve seat provided in the piston;
(b) a rigid peripheral shoulder adapted to operatively drive said piston to and fro,
(c) an apertured segment connecting said peripheral shoulder and said valve head,
(d) a valve stem projecting out of said piston, out of said cylinder and operatively engaging with said actuating means;



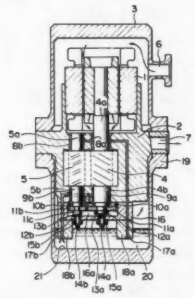
said central valve being the final mover of said pumping device at said intake cycle, liquid is poured down through said intake opening, passed said apertured segment and said valve seat and filled into said pump cylinder; at said pumping cycle, said valve stem and the inlet valve being depressed; at a few millimeters downstroke said valve head strikes and seals said valve seat, at the same time said peripheral shoulder strikes said piston's interior shelf and drives it down, thus the inside liquid is compressed and pumped out through said valved output opening.

4,878,820

SCREW COMPRESSOR

Motomichi Doi, Katsuta; Minetoshi Izushi, Shimizu; Kazuhiko Kawaike, Katsuta, and Masayuki Urashin, Shimizu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 17, 1988, Ser. No. 194,917
Claims priority, application Japan, May 22, 1987, 62-123645
Int. Cl.[4] F04C *18/16*
U.S. Cl. 418—203 **12 Claims**



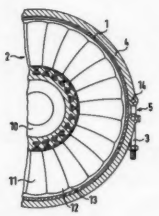
1. In a screw compressor including a casing, a pair of male and female rotors respectively formed in outer peripheries thereof with helical teeth and grooves, said male and female rotors being arranged within said casing in meshing relation to each other through said teeth and grooves for compressing gas at a mating section between said male and female rotors, two pairs of first and second radial plain bearing means are provided for respectively supporting shafts of said male and female rotors, a pair of thrust plain bearing means are provided adjacent said second radial bearing means for the respective shafts, for supporting respectively one ends of the shafts of the male and female rotors, each of said thrust plain bearing means being of dynamic-pressure type in which with rotation of a corresponding one of the shafts of the male and female rotors, pressure is applied to lubricant at a sliding section of the thrust plain bearing means to produce an anti-thrust force, and the lubricant is fed to each of said first radial plain bearing means for the respective shafts, and is fed to a space between an end of a sliding section of each of said second radial plain bearing means and an adjacent end of the sliding section of a corresponding one of said thrust plain bearing means so that the lubricant is distributed to the second radial plain bearing means and the thrust plain bearing means to lubricate these bearing means in proportion to a difference between flow resistance with which the lubricant passes through the second radial plain bearing means and flow resistance with which the lubricant passes through the thrust plain bearing means.

4,878,821

DETACHABLE ANTI-RUPTURE RING FOR THE HOUSING OF A TURBO POWER PLANT

Werner Huether; Axel Rossman, both of Karlsfeld, and Siegfried Sikorski, Munich, all of Fed. Rep. of Germany, assignors to MTU Motoren-und Turbinen-Union Munchen GmbH, Dachauer, Fed. Rep. of Germany

Filed Feb. 9, 1988, Ser. No. 154,142
Claims priority, application Fed. Rep. of Germany, Feb. 11, 1987, 3704197
Int. Cl.[4] F01D *25/24*
U.S. Cl. 415—9 **12 Claims**



1. An anti-rupture ring for a housing of a turbo power plant in a region subject to breakage of blades of a rotor in the housing, said ring having an axial slit and opposite spaced ends at said slit and comprising at least one detachable clamping device engaging the ends of the ring at said slit and including means for applying adjustable force to the ends of the ring and thus adjustable circumferential tension in said ring, said at least one clamping device comprising a hydraulic piston.

4,878,822

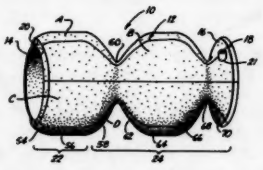
TIRE RECAPPING CURING JACKET

Terry L. Wetch, 704 31st St. Northwest, Fargo, N. Dak. 58012

Filed Apr. 1, 1988, Ser. No. 176,447
Int. Cl.[4] B29C *35/02, 37/00*
U.S. Cl. 425—14 **7 Claims**

1. For use in conjunction with a tire to be recapped and having a pair of sidewalls and a tread, a curing jacket for encasing the tire, including:
a tubular envelope having first and second edges and configured to extend around a circumference of and adjacent to interior and exterior surfaces of the sidewalls and tread of the tire;

an O-ring member on the first edge of the envelope;
a complementary seat member for joining with the O-ring member, on the second edge of the envelope; and



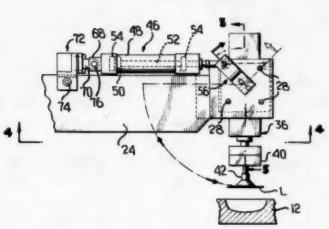
evacuation means for permitting air to be evacuated from the sealed envelope.

4,878,823

APPARATUS FOR APPLYING A LABEL TO AN OPEN MOLD HALF

Leonard A. Blomquist, Joliet, Ill., assignor to Continental Plastic Containers, Inc., Norwalk, Conn.

Filed Mar. 1, 1984, Ser. No. 585,077
Int. Cl.[4] B29B *11/06*; B65C *9/14*
U.S. Cl. 425—116 **10 Claims**



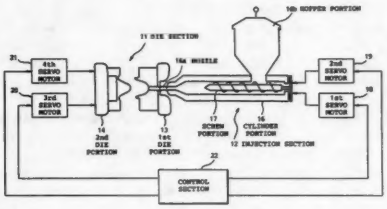
1. An apparatus for applying a label to an open mold half of a Ferris wheel type blow molding machine, said apparatus comprising a support member having means for attachment to a frame of a Ferris wheel type blow molding machine, a shaft assembly including a housing and a shaft rotatably journalled in said housing and projecting from opposite ends of said housing, means fixedly securing said housing to said support member with one of said shaft ends projecting transversely beyond said support member, a support unit carried by the other of said shaft ends, an extensible fluid motor carried by said support unit, said fluid motor having an axis disposed substantially normal to said shaft, and a label pick-up and delivery suction head carried by said extensible fluid motor for controlled projection and retraction; and drive means for selectively and rotatably oscillating said shaft to position said suction head at a label stack, then at an open mold half, and return to the label stack, said drive means including a second extensible fluid motor, said second extensible fluid motor having a cylinder and a piston carrying a piston rod, mounting means mounting an end of said cylinder remote from said piston rod to said support member, a lever arm on said shaft one end, and means directly connecting said piston rod to said lever arm.

4,878,824

INJECTION MOLDING MACHINE HAVING SELECTIVELY CONTROLLABLE MOTORS

Hitoshi Hara, Funabashi, Japan, assignor to Sumitomo Heavy Industries, Ltd., Tokyo, Japan

Filed Dec. 14, 1988, Ser. No. 284,401
Claims priority, application Japan, Dec. 15, 1987, 62-315220
Int. Cl.[4] B29C *45/80*
U.S. Cl. 425—139 **7 Claims**



1. In an injection molding machine for molding a melted resin into a product by injecting said melted resin from an injection section to a die section in accordance with a predetermined injection molding process, said injection molding machine comprising first motor means for introducing said melted resin into said injection section, second motor means coupled to said injection section for injecting said melted resin from said injection section to said die section, third motor means for opening and clamping said die section, fourth motor means for ejecting said product from said die section, and a control section for controlling said first, said second, said third, and said fourth motor means to carry out said predetermined injection molding process, the improvement wherein:

each of said first, said second, said third, and said fourth motor means is grouped into either one of first and second groups so that said motor means of each of the first and the second groups has a driving duration which is not overlapped with one another;

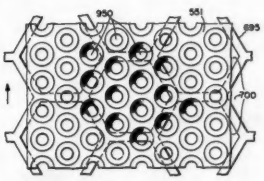
said control section comprising first and second control means coupled to said first-group and said second-group motor mean for individually and selectively controlling said first-group motor means and said second-group motor means.

4,878,825

STATIONARY SUPPORT MEMBER IN FORMING AREA FOR UNIFORMLY DEBOSSING AND APERTURING A MOVING PLASTIC WEB

William I. Mullane, Jr., Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 542,796, Oct. 17, 1983, abandoned. This application Jan. 23, 1986, Ser. No. 822,686
Int. Cl.[4] B29C *71/00*
U.S. Cl. 425—290 **4 Claims**



1. A apparatus for uniformly debossing a moving ribbon of substantially planar plastic film as said film moves continuously in the machine direction to impart a fine scale three-dimensional pattern thereto, said apparatus comprising:

(a) a three-dimensional forming structure comprising a cylinder, said cylinder exhibiting said fine scale three-dimensional pattern for supporting said plastic film, said three-dimensional pattern including a first predetermined pattern of apertures therein;

(b) a fluid pressure differential zone comprising a peripherally stationary vacuum chamber located inside said cylinder;

(c) means for rotating said cylinder in the machine direction across said fluid pressure differential zone while said plastic film is supported on said cylinder; and

(d) stationary support means located in said vacuum chamber immediately adjacent the innermost surface of said cylinder, said peripherally stationary support means and said cylinder being movable relative to one another as measured in a radial direction, said apparatus further including means for exerting a constant force between said peripherally stationary support member and the innermost surface of said cylinder to prevent deformation of said cylinder in said fluid pressure differential zone, said stationary support means having a second pattern of apertures therein, said apertures in said second pattern overlapping one another in the cross-machine direction so that a continuous, uninterrupted straight line oriented parallel to the machine direction and completely traversing said fluid pressure differential zone cannot be inscribed on the land area defining said apertures in said support member, said apertures in said support means being so sized and spaced relative to said first pattern of apertures in said three-dimensional forming structure that substantially all of said apertures in said three-dimensional forming structure are exposed to the fluid pressure differential existing on the opposite sides of said plastic film in said fluid pressure differential zone at some point during their traverse of said fluid pressure differential zone, whereby said plastic web is uniformly debossed in the pattern of said three-dimensional forming structure.

4,878,826

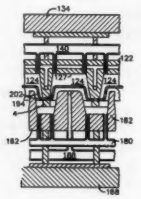
APPARATUS FOR THERMOFORMING PLASTIC MATERIALS

Michael L. Wendt, 1382 E. Hull Rd., Hope, Mich. 48628

Division of Ser. No. 192,057, Dec. 7, 1987. This application Jan. 17, 1989, Ser. No. 297,958

Int. Cl.[4] B29C *51/42*

U.S. Cl. 425—384 **24 Claims**



16. In a molding apparatus for forming articles out of a sheet of polyethylene teraphthalate material wherein the molding apparataus includes a mold with a female mold section having at least one cavity configured in the shape of an article to be formed and a first passageway communicating with said cavity and a switchable vacuum source to apply negative pressure to the cavity to vacuum form the article out of a sheet of the material and a male mold section having a plug assist sized for advancement into said cavity to assist stretching of the material during the forming thereof as said molding apparatus moves toward a closed position and means for opening and closing the mold, an improved construction operative to enhance crystallization of the polyethylene teraphthalate comprising an inlet extending axially through said plug assist to an orifice facing said cavity, said inlet in switchable fluid communication with a first source of gas at a first pressure and first temperature and in switchable fluid communication with a third source of gas at a third pressure and third temperature, a second passageway laterally adjacent said plug assist and communicating with said cavity when the mold is closed and connected in switchable fluid communication with a second source of gas at a second pressure and second temperature and connected in switchable fluid communication with an exhaust outlet whereby a first stream of gas from said first source of gas may be directed against said sheet as the mold is closing at a sufficient pressure to prevent contact between the sheet and the plug assist during closing of the mold after which the cavity may be pressurized with pressurizing gas from the second source of gas through said second passageway for a selected molding time after which a second stream of gas from said third source of gas may be directed through said inlet against the article and exhausted through the second passageway.

4,878,827

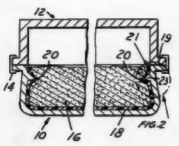
PLASTIC SHELL FOR FOAM MOLDINGS

John Muller, Englewood, Tenn., assignor to Davidson Textron Inc., Dover, N.H.

Filed Aug. 22, 1988, Ser. No. 234,575

Int. Cl.[4] B29C *41/04*

U.S. Cl. 425—434 **2 Claims**



1. A heated slush mold for molding a vinyl skin shell from powder material which fills the mold to cover heated surfaces thereon for forming a deposited layer of fused plastic thereon for forming a hollow shell, said slush mold comprising: a body portion having a heated deposit surface therein and an inlet surface including an upper segment defining an opening for flow of powder material into a cavity, said heated deposit surface further including a lower segment, said heated deposit surface also including a ridge portion formed on said body portion at a point between said upper segment and said lower segment, said ridge portion including an inclined surface and a reentrant surface intersecting at a sharp angle for defining a tear edge, said reentrant surface having a predetermined height and a predetermined slope formed at select areas of said mold for forming a resultant gasket edge on a shell of material fused on said deposit surface, said inclined surface having material deposited thereon that is stippable from said deposit surface for tearing along said tear edge so as to form a sharp edge on said formed gasket edge of a resultant molded shell.

4,878,828

CLOSING DEVICE FOR MANUFACTURING ARTICLES OF THERMOPLASTIC MATERIAL

Dieter Wollschläger, Königswinter, and Helmut Scharrenbroich, Neunkirchen-Seelscheid, both of Fed. Rep. of Germany, assignors to Battenfeld Fischer Blasformtechnik GmbH, Troisdorf/Spich, Fed. Rep. of Germany

Filed Jul. 7, 1988, Ser. No. 216,282

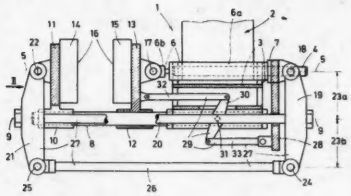
Claims priority, application Fed. Rep. of Germany, Jul. 7, 1987, 3722340

Int. Cl.[4] B29C *49/56*

U.S. Cl. 425—541 **12 Claims**

1. In a closing device for molds for manufacturing articles of

thermoplastic material, the device including guide beams and first and second die plates which are linearly displaceable on the guide beams in a direction of displacement, and a power drive for moving the guide beams in opposite directions relative to each other, the device further including a frame comprising at least one tension rod, a compression rod and first and second yokes connecting the at least one tension rod and the compression rod, the at least one tension rod and the compression rod extending parallel to the direction of displacement and the yokes extending transversely of the direction of displacement of the die plates, the first yoke including a cantilever arm



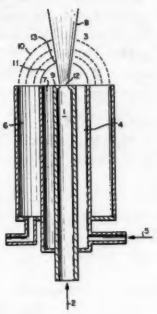
for acting directly on the first die plate, the second yoke being connected to the power drive, the power drive being connected between the second yoke and the second die plate, the improvement comprising a fixed housing which is fixed with respect to space, the housing supporting the guide beams independently of the frame, suspension means for supporting the frame wherein the power drive is arranged in the housing, support elements connected to the yokes of the frame, the yokes acting on at least one of the first die plate and the power drive through the support elements, wherein the support elements have axial planes which are located on a line of application of a closing force between the two guide plates.

4,878,829

FUEL JET BURNER AND COMBUSTION METHOD

John E. Anderson, Somers, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.

Filed May 5, 1988, Ser. No. 190,396
Int. Cl.[4] F23C *5/00*
U.S. Cl. 431—8 **22 Claims**



1. A method for combusting gaseous fuel and oxidant comprising:

(A) injecting into a combustion zone the major portion of the gaseous fuel required for the combustion as at least one stream at a high velocity V which is greater than 5P where P is the volume percent oxygen in the oxidant and V is in feet per second;

(B) injecting into said combustion zone in proximity to the major fuel, a minor portion of the gaseous fuel required for the combustion, said minor portion comprising at least 1 percent of the total gaseous fuel injected into the combustion zone, at a low velocity less than 0.5 V;

(C) injecting oxidant, comprising at least 30 percent oxygen, into the combustion zone in proximity to the minor fuel to form an interface between said oxidant and said minor fuel, at a velocity such that the low velocity of the minor fuel is within 200 feet per second of the velocity of the oxidant at the interface;

(D) combusting minor fuel with oxidant at the interface;

(E) entraining minor fuel into the high velocity major fuel immediately after injection of the major fuel into the combustion zone and thereafter entraining oxidant into the high velocity major fuel; and

(F) drawing hot combustion products from the interface into the high velocity major fuel, said hot combustion products serving as a continuous source of ignition for the oxidant and major fuel, and combusting oxidant and high velocity major fuel in a stable flame.

11. Burner apparatus for use with pure oxygen or oxygen-enriched air as the oxidant comprising:

(A) means for providing major fuel for injection into a combustion zone said major fuel provision means comprising a central fuel supply tube and a nozzle at the injection end of the supply tube, said nozzle having at least one orifice therethrough for passage of gaseous fuel from the supply tube into the combustion zone;

(B) an annular opening around the nozzle for providing minor fuel to the combustion zone in proximity to the major fuel injection so that minor fuel is entrained into major fuel immediately after injection of major fuel into the combustion zone, said annular opening connected by conduit means to a source of gaseous fuel; and

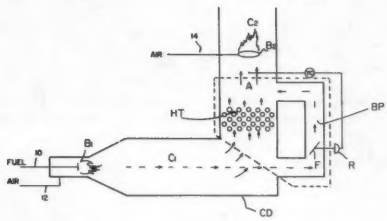
(C) means for providing oxidant to said combustion zone in proximity to the minor fuel provision means, said oxidant provision means connected by conduit means to a source of oxidant comprising at least 30 volume percent oxygen, so that said oxidant and minor fuel form an interface within the combustion zone prior to contact between oxidant and major fuel.

4,878,830

SUBSTOICHIOMETRIC FUEL FIRING FOR MINIMUM NO_x EMISSIONS

James K. Henderson, New Orleans, La., assignor to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 208,610, Jun. 20, 1988, abandoned. This application Feb. 24, 1989, Ser. No. 315,880
Int. Cl.[4] F23M *3/04*
U.S. Cl. 431—10 **5 Claims**



1. A method for combusting hydrocarbonaceous fuels such that minimum amounts of NO_x are produced, which process comprises:

(a) introducing a mixture of fuel and an oxygen-containing gas into a first combustion zone at substoichiometric conditions of oxygen to fuel,

(b) combusting the mixture of fuel and oxygen-containing gas to oxygen depletion,

(c) passing the combustion gases to a heat transfer device for heat removal which is controlled by continuously monitoring the temperature of the combustion gases exiting the heat transfer device, at least a portion of the gases being cooled by heat exchange relaying said temperature information to a control mechanism associated with the heat transfer device which controls the amount of heat removed from the combustion gases such that the temperature of the combustion gases are lowered to a range of at least 500° F. below the combustion temperature of the first stage, but not lower than the ignition temperature of the combustion gases exiting the heat transfer device; and

(d) passing said combustion gases exiting the heat transfer device to a second combustion zone where a sufficient amount of oxygen-containing gas is introduced into the combustion gas stream to complete combustion of the remaining combustible gases.

4,878,831

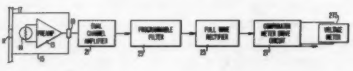
INFRARED FLAME DETECTOR ADAPTABLE FOR DIFFERENT FUELS

Donald L. Ewing, Richardson, Tex., assignor to Forney International, Inc., Carrollton, Tex.

Filed Oct. 24, 1988, Ser. No. 261,335

Int. Cl.[4] F23N *5/08*

U.S. Cl. 431—79 **8 Claims**



1. A flame detection system comprising an infrared photodetector positioned to receive infrared radiation from a flame and operable to generate an output signal corresponding to the intensity of the received infrared radiation, amplifying means to amplify the AC variation in the output signal from said photodetector, programmable high pass filter means connected to the output of said amplifying means to pass AC signal components in the output signal of said amplifying means above a corner frequency, control means to vary said corner frequency between selected values, means to rectify the output signal of said high pass filter means to produce a DC signal level corresponding to the amplitude of the AC output signal of said filter means, comparison means to compare the DC output signal of said rectifier with a reference value and produce a first output signal value when the output signal of said rectifier is above said reference level indicating the presence of a flame and to produce a second output signal value when the output signal of said rectifier is below said reference value indicating the absence of a flame.

4,878,832

BURNER ILLUMINATOR DEVICE

Michael B. Lynch, 717 King St., Alexandria, Va. 22314

Filed Oct. 23, 1980, Ser. No. 200,037

Int. Cl.[4] F23D *3/28*

U.S. Cl. 431—120 **4 Claims**

1. A method of making a disposable burner-iluminator device comprising:

inserting a wick member into a receiving aperture in a buoyant flotation collar,

flattening at least one end of said wick member to extend the diameter of said end larger than the diameter of said receiving aperture.

4,878,833

GASLIGHTER STRUCTURE

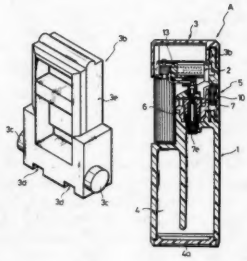
Tomio Nitta, Yokohama, Japan, assignor to Tokai Corporation, Yokohama, Japan

Filed Apr. 28, 1989, Ser. No. 344,725

Claims priority, application Japan, May 11, 1988, 63-61048[U]

Int. Cl.[4] F23Q *25/00*

U.S. Cl. 431—146 **1 Claim**



1. A gaslighter which comprises: a lighter body comprising a housing having a built-in gas container to be filled with a liquefied petroleum gas, a nozzle fixed to a top plate of said housing and a cap pivot latch provided to the rear top of said housing: a flint unit comprising a mount having a cover fitted thereon, said cover having a flame apertue made in its front, a flint mechanism in the vicinity of said flame aperture and a conduit opening at its front end in the vicinity of said flame aperture, extending under said mount and connected at its rear end to said nozzle assembly; and a cap having a support piece at its rear end, said cap being fixed to said cap pivot latch to permit said cap to turn about its pivot and cover said flint unit when closed, characterized in that said support piece comprises a generally rectangular synthetic resin mold having pivots integrally fixed to its lower opposite sides, said support piece having its upper end push-fitted into the rear end space of said cap, and said support piece having its pivots fitted in countersinks of the rear top inside of said housing.

4,878,834

GASLIGHTER STRUCTURE

Tomio Nitta, Yokohama, Japan, assignor to Tokai Corporation, Yokohama, Japan

Filed Apr. 28, 1989, Ser. No. 344,347

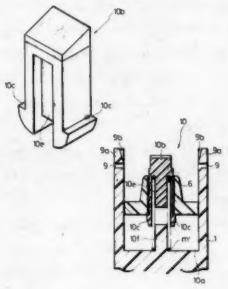
Claims priority, application Japan, May 11, 1988, 63-61047[U]

Int. Cl.[4] F23Q *25/00*

U.S. Cl. 431—152 **2 Claims**

1. A gaslighter which comprises: a lighter body comprising a housing having a built-in gas container to be filled with a liquefied petroleum gas, a nozzle assembly fixed to a top plate of said housing and a cap pivot-and-latch provided to the rear, top of said housing; a flint unit comprising a mount having a cover fitted thereon, said cover having a flame aperture made in its front, a flint mechanism in the vicinity of said flame aperture and a conduit opening at its front end in the vicinity of said flame aperture, extending under said mount and connected to said nozzle assembly; and a cap having a support piece at its rear end, said cap being fixed to said cap pivot-and-latch to turn about its pivot and cover said flint unit when

closed, characterized in that said cap pivot-and-latch comprises, in the hollow cylinder space defined by the inner wall of the rear portion of said housing and the rear side of the top plate of said housing, a push rod having hooks integrally con-



nected to its opposite sides to be caught by the lower edge of the top plate of said housing, and an associated spring, said push rod being spring-biased upwards and pushed against said support piece of said cap, thereby permitting said cap to clock shut and open.

4,878,835

CERAMIC BURNER FOR PARTIAL OXIDATION OF A HYDROCARBON-CONTAINING FUEL

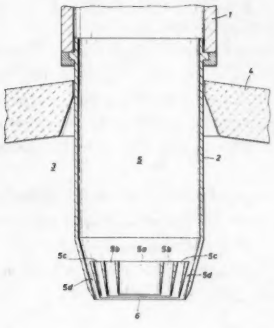
Franciscus J. A. Martens, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Jul. 25, 1988, Ser. No. 223,813

Claims priority, application United Kingdom, Sep. 10, 1987, 8721282

Int. Cl.[4] F23C *7/00*

U.S. Cl. 431—187 **7 Claims**



1. A burner for the partial oxidation of hydrocarbon-containing fuel and an oxygen-containing gas, said burner comprising a tubular burner head having a feed supply end and a discharge end, said burner head being disposed around an arrangement of a plurality of concentric tubular passages for feeding the fuel and oxygen-containing gas to a partial oxidation reactor, wherein said burner further comprises a thin-walled tubular mantle of impervious ceramics having a high thermal conductivity, said tubular mantle having an inner skin and an outer skin and being mounted at the feed supply end on the burner head and the other, discharge end, disposed to protrude into the reactor, and to separate the said tubular passages from the reactor environment, wherein the outer skin of said mantle is exposed to the reactor environment whereas the inner skin of said mantle, during operation of the burner, is cooled by at least one of the feed streams.

4,878,836

GASLIGHTER STRUCTURE

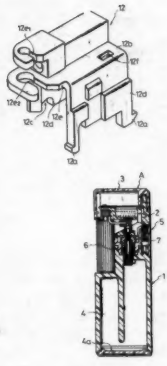
Tomio Nitta, Yokohama, Japan, assignor to Tokai Corporation, Yokohama, Japan

Filed Apr. 28, 1989, Ser. No. 344,722

Claims priority, application Japan, May 11, 1988, 63-61049; May 11, 1988, 63-61050; May 11, 1988, 63-61051

Int. Cl.[4] F23Q *25/00*

U.S. Cl. 431—277 **3 Claims**



1. A gaslighter which comprises: a lighter body comprising a housing having a built-in gas container to be filled with a liquefied petroleum gas, a nozzle assembly fixed to a top plate of said housing and a cap pivot latch provided to the rear top of said housing; a flint unit comprising a mount having a cover fitted thereon, said cover having a flame aperture made in the front, a flint mechanism in the vicinity of said flame aperture and a conduit opening at the front end in the vicinity of said flame aperture, extending under said mount and connected at the rear end to said nozzle assembly; and a cap having a support piece at the rear end, said cap being fixed to said cap pivot latch to permit said cap to turn about its pivot and cover said flint unit when closed, characterized in that said mount comprises a flat plateau and opposite walls integrally connected to the opposite longitudinal edges of said plateau in the form of the letter "U", each wall having at least one hook to be caught by said top plate of said housing.

4,878,837

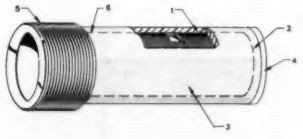
INFRARED BURNER

Nancy M. Otto, Clay, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Feb. 6, 1989, Ser. No. 306,128

Int. Cl.[4] F23D *14/12*

U.S. Cl. 431—328 **2 Claims**



1. An infrared burner comprising a corrosion resistant mesh screen having deposited thereon a thick porous coating of ceramic fibers having structural integrity, ability to generate

radiant energy at the rate of 80,000 BTU to 100,000 BTU per sq.ft. per hour, a pressure drop during operation of up to 0.4 inch of water, and a pressure drop cold versus hot of up to 0.2 inch of water.

4,878,838

PROCESS FOR THE THERMAL TREATMENT OF MORE PARTICULARLY SUBSTANTIALLY FLAT BODIES OF A CERAMIC MATERIAL AND CONTINUOUS FURNACE FOR THE PERFORMANCE OF THE PROCESS

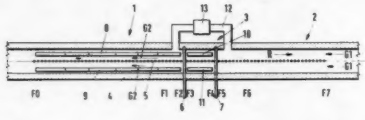
G. M. C. Verbeyden, Jr., Doesburg, Netherlands, assignor to A.P.T. Anlagen fur Pyrotechnik GmbH, Dusseldorf, Fed. Rep. of Germany

Filed Nov. 30, 1987, Ser. No. 126,536

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1986, 3640727

Int. Cl.[4] F26B *13/00*; F27B *9/02*

U.S. Cl. 432—8 6 Claims



1. A process for the thermal treatment of substantially flat bodies of a ceramic material in a continuous furance having conveying rollers, a heating zone, a firing zone and a cooling zone, comprising treating the bodies in the firing zone while it is divided off from the preceding and following zones while subjecting the bodies to continuous horizontal reciprocating movement in the firing zone, while the bodies are treated in the firing zone interrupting the continuous conveying in the firing zone direction of the bodies in the heating zone, continuing the conveying of the bodies in the cooling zone at least until the bodies have been removed from the cooling zone portion immediately following the firing zone, and after the treatment of the bodies in the firing zone conveying the bodies out of the firing zone over a portion downstream of the firing zone at a conveying speed greater than that in the other portions.

4,878,839

NON-POLLUTING HOT GAS GENERATING SYSTEM

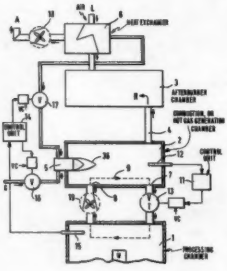
Joachim Wunning, Leonberg, Fed. Rep. of Germany, assignor to WS Wärmeprozesstechnik GmbH, Rennigen, Fed. Rep. of Germany

Filed Aug. 22, 1988, Ser. No. 234,799

Claims priority, application Fed. Rep. of Germany, Sep. 8, 1987, 3729971

Int. Cl.[4] F26B *5/00*

U.S. Cl. 432—72 24 Claims



1. Non-environmentally polluting hot gas generating system, emitting clean, non-polluting exhaust gases, comprising

a hot gas generating chamber (2) and an after-burner chamber (3) forming, together, a combustion chamber;

a burner means (5) emitting a fuel jet (36) located in said hot gas generating chamber and ejecting a flame jet into the chamber in a predetermined direction;

a processing chamber (1) for carrying out thermal treatment of processes during which polluting matter including at least one of: combustible or oxidizable gases, combustible or oxidizable vapors, or combustible or oxidizable particles are liberated;

a hot gas outlet (7) from the gas generating chamber (2) and coupled to the processing chamber (1) to provide hot gases therefor,

said hot gases being cooled while carrying out said thermal treatment and liberating polluting matter;

a hot gas recirculating inlet (8) into the gas generating chamber and coupled to the processing chamber to receive said cooled hot gases, together with liberated polluting matter, said cooled hot gases together with the liberated polluting matter and the hot gases generated by the burner mixing in a hot gas generating chamber (2) and forming a raw gas (R),

a portion of said hot gas generating chamber, said hot gas outlet (7), a portion of the processing chamber (1) and the recirculating inlet into the hot gas generating chamber forming a closed gas cycling loop (9) in which a predetermined quantity of gases circulates;

burner control means (14) controlling fuel supply to the burner to furnish said hot gases for said thermal treatment and energizing the gases in the hot gas generating chamber for circulation in said gas circulating loop (9);

said after-burner chamber (3) communicating with the hot gas generating chamber (2),

said after-burner chamber (3) defining a volume which is large enough to provide for a dwell time in said after-burner chamber of the raw gas supplied thereto from the hot gas generating chamber (2) to completely burn or oxidize said polluting matter to result in a non-polluting gas (A);

a heat exchanger (6) coupled to receive the nonpolluting gas (A) from said after-burner chamber, said heat exchanger having an air heat exchange inlet (L) for admitting ambient air and heating said ambient air by removing heat from the non-polluting gases and said air thereby becoming preheated;

means (17) for coupling the preheated air from the heat exchanger to the burner means (5) to thereby supply preheated combustion air thereto;

sensing means (12) sensing at least the temperature of the raw gases (R) in the combustion chamber (2); and

control means (11, 13) responsive to the sensed temperature of the raw gases (R) and maintaining the temperature of the raw gases (R) entering the after-burner chamber (3) from the combustion chamber (2) at a predetermined command level which is sufficiently high to effect complete combustion of the raw gases (R) and result in said non-polluting gas (A).

4,878,840

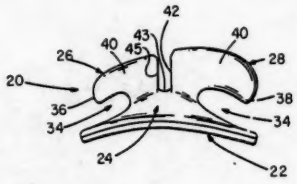
ORTHODONTIC APPLIANCE

James M. Reynolds, Lubbock, Tex., assignor to Zulauf, Inc., Lubbock, Tex.

Continuation of Ser. No. 15,568, Feb. 13, 1987, which is a continuation of Ser. No. 625,075, Jun. 27, 1984, abandoned, which is a continuation of Ser. No. 506,404, Jun. 21, 1983, abandoned, which is a continuation of Ser. No. 355,137, Mar. 5, 1982, abandoned, which is a continuation of Ser. No. 135,652, Mar. 31, 1980, abandoned, which is a continuation of Ser. No. 930,577, Aug. 3, 1978, Pat. No. 4,216,583. This application Feb. 22, 1988, Ser. No. 158,632

Int. Cl.[4] A61C *7/00*

U.S. Cl. 433—9 **11 Claims**



1. An orthodontic appliance comprising:

a base having an inwardly facing surface on one side thereof adapted for attaching the appliance and a body portion extending outwardly from the other side of said base;

said body portion having one embodiment substantially shorter than a corresponding dimension of the base;

a pair of wings, each wing extending in opposite directions from the body portion and having a length extending substantially beyond the body portion to define wire receiving slots between the base and the ends of said wings;

the wings defining an outwardly facing domed surface which is curved in at least one direction and which thereby presents a comfortable surface to the mouth tissue of the patient; and

a cross slot extending into said body portion between the wings and configured to receive therein a dental appliance of predetermined dimensions, the cross slot having a curved surface between the bottom of the cross slot and the sides of the cross slot to reduce stress concentrations.

4,878,841

PERIODONTAL PROBE

Christopher A. G. McCulloch, 9 Holloway Road, Islington, Ontario, Canada (M9A 1E7), and Peter Birek, 169 Hillcrest Ave., Willowdale, Ontario, Canada (M2N 3N9)

Filed Jun. 19, 1986, Ser. No. 876,115

Int. Cl.[4] A61C *19/04*

U.S. Cl. 433—72 **21 Claims**

1. Apparatus for determining the attachment point of tissue to a tooth comprising:

a body for insertion into the mouth;

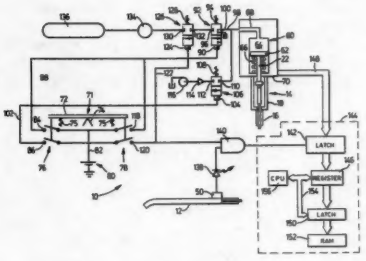
a datum surface on said body for engagement with a location on the tooth;

a probe moveable relative to said datum surface into engagement with said tissue;

drive means operable upon said probe to control movement thereof;

measuring means to measure movement of said probe relative to said datum surface, said drive means including force control means to regulate the force applied by said drive means to said probe to maintain said force at a predetermined value; and

attitude sensing means located on said body for inhibiting operation of said measuring means upon movement of said body from a predetermined attitude, thereby permitting movement of said probe when said body is positioned in any attitude whilst inhibiting the measuring of such movement of said probe until said body is positioned in said predetermined attitude while allowing the measuring of



movement once said body is positioned in said predetermined attitude.

4,878,842

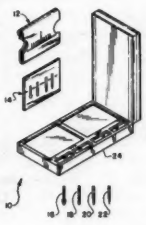
APPARATUS AND METHOD FOR PREPARING TEETH FOR CROWN OR BRIDGE WORK OR OTHER DENTAL WORK

Louis J. Malcmacher, 30016 Donoit Rd., Westlake, Ohio 44145, and Jeffrey S. Gross, 34586 Lakeshore Blvd., Eastlake, Ohio 44094

Filed Nov. 2, 1987, Ser. No. 115,704

Int. Cl.[4] A61C *19/04*

U.S. Cl. 433—72 **6 Claims**



1. A dental drilling kit comprising a plurality of drill bits of different profiles and measuring means for determining the proper one of the bits for use in preparing a tooth, said measuring means comprising a first transparent sheet having a reference scale printed on it and a second reference sheet having a profile of each of the drill bits printed on it, said first sheet formed of a transparent plastic material folded to define a front panel and a rear panel, said front panel and said rear panel being adapted to receive said second reference sheet therebetween, said front and rear panels including congruent arcuate cut-outs in opposite lateral edges to facilitate manipulation of said second reference sheet between said front panel and said rear panel.

4,878,843

PROCESS AND APPARATUS FOR CONVEYING INFORMATION THROUGH MOTION SEQUENCES

Nina J. Kuch, 2197 Dorset St., Shelburne, Vt. 05482

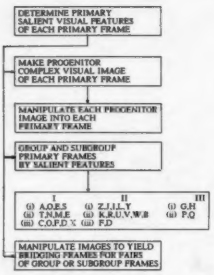
Filed Jun. 8, 1988, Ser. No. 203,818

Int. Cl.[4] G09B *21/00*

U.S. Cl. 434—112 **29 Claims**

13. A process for the teaching of finger spelling utilizing the manual alphabet, comprising:

(a) determining the primary salient visual features which are to be contained as visual elements of principal frames respectively representing the letters of the manual alphabet;
(b) making a complex visual image as a progenitor of each principal frame of the respective letters;
(c) manipulating each complex image to emphasize the determined primary salient visual features to yield the respective desired visual elements of the respective letter;


DETERMINE PRIMARY SALIENT VISUAL FEATURES OF EACH PRIMARY FRAME
MAKE PROGENITOR COMPLEX VISUAL IMAGE OF EACH PRIMARY FRAME
MANIPULATE EACH PROGENITOR IMAGE INTO EACH PRIMARY FRAME
GROUP AND SUBGROUP PRIMARY FRAMES BY SALIENT FEATURES
I
II
III
(i) A,O,E,S
(ii) T,N,M,E
(iii) C,O,P,D
(i) Z,J,I,L,Y
(ii) K,R,U,V,W,B
(iii) P,D
(i) G,H
(ii) P,Q
MANIPULATE IMAGES TO YIELD BRIDGING FRAMES FOR PAIRS OF GROUP OR SUBGROUP FRAMES

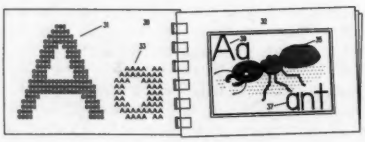
(d) dividing the principal frames of the respective letters into groups and subgroups according to their common respective salient features;
(e) determining the primary salient visual features in common of a plurality of pairs of groups and subgroups; and
(f) manipulating an image to provide at least one bridging frame containing selected salient features of the principal frames of said pair, such that the display in sequence of the principal frames of said pair, interposed by the bridging frame, provides an illusion of motion to an observer in the displayed sequence of frames.

4,878,844

TEACHING AID HAVING TACTILE FEEDBACK

Elon Gasper, and Nedra Goedert, both of Redmond, Wash., assignors to Bright Star Technology, Inc., Bellevue, Wash.

Filed Jun. 20, 1988, Ser. No. 208,881
Int. Cl.[4] G09B *17/00*
U.S. Cl. 434—159 **4 Claims**



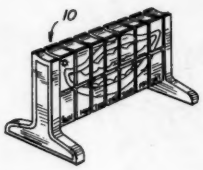
1. A teaching aid in booklet-form comprising:
a plurality of pages, each page having a different letter of an alphabet printed on a first side of said page and an object or animal depicted on a second side of said page, said object or animal associated with a letter of the alphabet, said associated letter different than the letter printed on the first side of said page, said plurality of pages arranged such that the first side of a page faces the second side of the next successive page, the letter on the first side of said page associated with the object or animal depicted on the second side of said next successive page;
each of said different letters comprising a plurality of relatively small like letters disposed in spaced relationship on the surface of the first side of a different page and arranged in a pattern to form an outline of said letter, said outline filled in with said small like letters in said spaced relationship; and
each of said small like letters formed to protrude slightly from the surface of the page.

4,878,845

DEVICE FOR ENCOURAGING CHILDREN TO BRUSH THEIR TEETH REGULARLY

Tom E. Lindsay, 1607 Hamilton Ave., Palo Alto, Calif. 94303, and James C. Smith, Hayward, Calif., assignors to Tom E. Lindsay, Lake Oswego, Oreg.

Filed Mar. 14, 1988, Ser. No. 167,395
Int. Cl.[4] G09B *1/20;* **G09F** *9/00, 11/00*
U.S. Cl. 434—238 **11 Claims**



1. A device for aiding and encouraging a child to brush his teeth, comprising;
a mounting frame;
a pair of shafts nonrotatably mounted by said mounting frame;
a plurality of independently and individually rotatable, spaced-apart blocks each mounted for independent and separate rotation about a respective one of said pair of shafts;
each said shaft being mounted horizontally by said mounting frame, said shafts being mounted parallel to each other and vertically spaced apart; each said shaft mounting a plurality of said blocks for said independent and individual rotation in spaced-apart relationship; said blocks thus defining a first row and a second row, said rows being positioned very close to each other; and
each said block comprising an upper concave exterior surface and a lower concave exterior surface, so that the first row of blocks may be positioned very close to said second row of blocks and allow for the independent and separate rotation of each block with respect to the juxtapositioned block in the other row;
each said block having a front surface face and a rear surface face; each said front surface face comprising a printed design forming a portion of a frowning mouth; and each said rear surface comprising a printed design forming a portion of a smiling mouth.

4,878,846

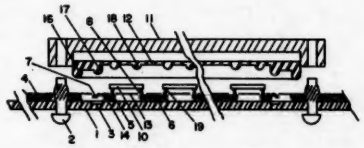
ELECTRONIC CIRCUIT CHIP CONNECTION ASSEMBLY AND METHOD

Jon M. Schroeder, Apt. 1013, 9815 Copper Creek, Austin, Tex. 78729

Continuation of Ser. No. 178,252, Apr. 6, 1988, abandoned, which is a continuation-in-part of Ser. No. 854,920, Apr. 23, 1986, abandoned. This application May 30, 1989, Ser. No. 358,503
Int. Cl.[4] H01R *9/09*
U.S. Cl. 439—65 **11 Claims**

1. A chip connecting assembly for connecting a plurality of electronic circuit chips to a substrate, comprising;
a. said plurality of electronic circuit chips and said substrate with electronic circuitry thereon;
b. a conductive preform containing a plurality of photoresist sites with each of said sites comprising multiple

conductive leads on an insulating photo-resist film; a first type of said multiple conductive leads having a less-than-30-micron sized electrical connector both on a first end and a second end that may be pressured by an elastomeric pressure means into pads of an adjacent pair of said plurality of electronic circuit chips when said pair of electronic circuit chips are placed on an adjacent pair of said plurality of sites; a second type of said multiple conductive leads having a less-than-30-micron sized connector on a beginning end thereof and an elongated connector on a terminal end thereof that may be pressured with said elastomeric pressure means to connect said less-than-30-micron sized connector on said beginning end to a pad on a said electronic circuit chip and said elongated connector on said terminal end to said electronic circuitry of said substrate;



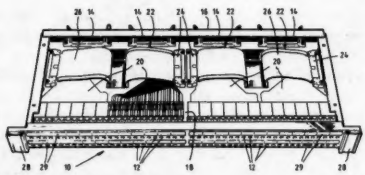
c. a rigid metallic cover having means to fasten said cover to said substrate and containing said elastomeric pressure means, said rigid metallic cover being sized to encompass said plurality of electronic circuit chips when each of said plurality of electronic circuit chips is placed on one of said sites of said conductive preform and with said elastomeric pressure means having primary projections that pressure said less-than-30-micron sized connectors into said pads of each of said plurality of electronic circuit chips and having secondary projections to pressure said elongated connectors on a second end of said conductive leads to connect with said electronic circuitry of said substrate and having a tertiary rib-like projection to seal against said substrate when said rigid metallic cover is biased toward said substrate by said means to fasten said cover to said substrate.

4,878,847

PATCHFIELD SYSTEM

Michael J. W. Rutledge, Collingwood, Australia, assignor to Rutledge Engineering (Aust.) Pty. Ltd., Australia

Filed Jul. 28, 1988, Ser. No. 225,387
Claims priority, application Australia, Jul. 29, 1987, PI3416
Int. Cl.[4] H01R 9/09
U.S. Cl. 439—74 **11 Claims**



1. A printed circuit patchfield assembly for patching of audio circuits, the assembly comprising:

a plurality of electrical jack means adapted for mounting in a front panel of the assembly, wherein said plurality of jack means are arranged into a first and a second group;

a plurality of rear electrical connecting means adapted for mounting in a rear connector panel of the assembly;

first and second double-sided printed circuit boards, said first board having a first plurality of electrically conducting tracks on a first side thereof for electrically interconnecting said first group of jack means to one of said rear connecting means, said second board having a first plurality of electrical conducting tracks on a first side thereof for electrically interconnecting said second group of jack means to another one of said rear connecting means, and wherein said first and second boards are further provided with a second plurality of electrically conducting tracks on the respective second sides thereof for electrically interconnecting said first and second groups of jack means; and,

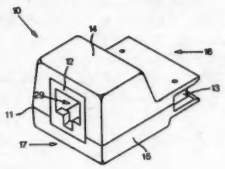
internal electrical connecting means whereby the second plurality of tracks on said first board can be electrically interconnected to the second plurality of tracks on the second board thereby, in use, said internal connecting means enables various normalling options to be provided between said first and second groups of jack means.

4,878,848

110 BLOCK ADAPTER

David L. Ingalsbe, Hastings, Minn., assignor to Independent Technologies, Inc., Omaha, Nebr.

Filed Jul. 14, 1988, Ser. No. 219,561
Int. Cl.[4] H05K 1/00
U.S. Cl. 439—76 **14 Claims**



1. A telecommunications interface adapter system for connecting a modular connector to a 110-type Block Terminal having a mating end, comprising:

a. modular connection means having a plurality of contact wires;

b. a housing structure enclosing said modular connection means and having a central cavity and a tapered plug end, said tapered plug end having receptacle means for connection to the mating end of the 110-type Block Terminal, said receptacle means further including channel means;

c. a plurality of upstanding conductive blades extending from said central cavity through and disposed within said channel means of said receptacle means and extending to the exterior of said housing structure at said tapered plug end to expose a portion of each said blade for mating contact with the 110-type Block Terminal; and

d. a printed board having means to electrically connect said contact wires of said modular connection means and said upstanding blades, said printed circuit board being located in said housing structure.

4,878,849

ELECTRICAL CONNECTOR HAVING MULTI-POSITION HOUSING

Anil K. Talwar, Schaumburg, and Joseph Warywoda, Chicago, both of Ill., assignors to Amphenol Corporation, Wallingford, Conn.

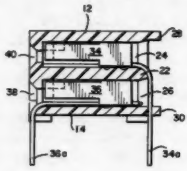
Filed Apr. 29, 1988, Ser. No. 187,985
Int. Cl.[4] H01R 0/00
U.S. Cl. 439—79 **20 Claims**

1. An electrical connector comprising:

(a) a housing defining a first, generally planar side and defining a plurality of openings arranged in first and second

rows extending generally parallel to each other and opening through the first side;

(b) a plurality of bosses formed on the housing in first and second rows and extending beyond the plane of the first side of the housing; and



(c) electrical contact pins inserted into the plurality of openings, each contact pin having a contact tail portion extending from the housing wherein said bosses in the second row of bosses are deformable so as to be capable of holding therebetween the contact tail portions of the contacts extending from the first side of the housing.

4,878,850

ELECTRIC POWER SUPPLY TERMINAL FOR ENCAPSULATED GLAZING

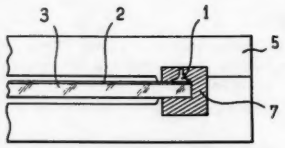
Bernard Letemps, Thourotte; Gérard Huchet, Retheuil, and Jacques Leclercq, Roisel, all of France, assignors to Saint-Gobain Vitrage, Courbevoie, France

Filed Jul. 15, 1988, Ser. No. 219,395

Claims priority, application France, Jul. 15, 1987, 87 09915

Int. Cl.[4] H01R *9/09*

U.S. Cl. 439—83 **13 Claims**



1. An electric power supply terminal for a glazing having an electrically conductive deposit and provided with electrical equipment, comprising:

terminal fastening means for assuring electrical connection on a conductive zone deposited on the glazing; and

means for fastening said terminal to a zone on an edge of the glazing covered with said conductive deposit, wherein the glazing is at least partially embedded in an encapsulation frame and said electric power supply terminal is embedded in said encapsulation frame so that said terminal is flush with an outside surface of said encapsulation frame.

4,878,851

ELECTRICAL SOCKET APPARATUS WITH TEMPORARY HOUSING

William B. Mullen, III, Boca Raton, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 92,351, Jul. 27, 1987, abandoned. This application Jan. 4, 1989, Ser. No. 293,617

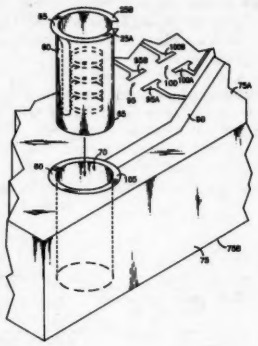
Int. Cl.[4] H05K *1/00*

U.S. Cl. 439—83 **4 Claims**

1. A socket for receiving an electrical lead therein, said socket being adapted for use on a substrate having at least one aperture, said socket comprising:

connecting means for receiving said electrical lead and making an electrical connection to said electrical lead; and

soluble housing means, attached to said connecting means, for temporarily housing said connecting means such that said soluble housing means prevents solder from reaching inside said aperture when said connecting mean inserted



into said aperture during a soldering operation, said soluble housing means being removable via solvent from said connecting means after said soldering operation.

4,878,852

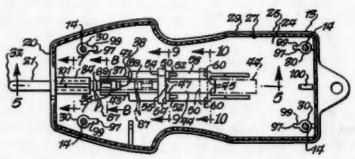
CIRCUIT TESTER CONSTRUCTION

Jack E. Bertsch, Orchard Park, and Harold P. Kopp, Williamsville, both of N.Y., assignors to Polytronics, Inc., Buffalo, N.Y.

Filed Jun. 3, 1988, Ser. No. 202,114

Int. Cl.[4] H01R *4/66*

U.S. Cl. 439—103 **19 Claims**



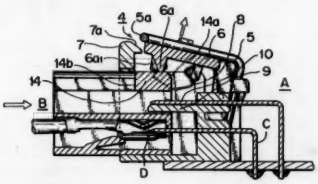
1. In an electrical device having a housing and prong means for insertion into an electrical socket, a retractable ground pin construction comprising an elongated ground pin having an inner end and having an outer end for movement between retracted and extended positions relative to said housing, means on said housing for rectilinearly guiding said ground pin for movement between said extended and extracted positions relative to said housing, an elongated member in said housing, first and second ends on said elongated member, means securing said first end of said elongated member to said inner end of said ground pin, interengaging means for interfitting with and selectively positively locking said elongated member to said housing to fixedly lock said ground pin in said extended position, and manually actuatable means secured to said elongated member and extending through said housing to the outside thereof for effecting movement of said elongated member and said ground pin secured thereto in a rectilinear direction to said extended position wherein said interengaging means fixedly lock said ground pin in said extended position and for moving said interengaging means out of said interfitting locking engagement with said housing and effecting movement of said elongated member and said ground pin connected thereto to said retracted position.

4,878,853

LOCKING DEVICE FOR CONNECTOR ASSEMBLY

Kenichi Yamade; Sukeyoshi Nakashima, both of Tokyo; Shigemitsu Inaba, and Kazuto Ohtaka, both of Shizuoka, all of Japan, assignors to Yazaki Corporation, Tokyo, Japan

Filed Mar. 23, 1989, Ser. No. 327,675
Claims priority, application Japan, Mar. 23, 1988, 63-67318
Int. Cl.[4] H01R *13/639*
U.S. Cl. 439—144 6 Claims



1. A locking device for a connector assembly for enabling an operator to confirm the complete connection between a first connector and a second connector so as to gain electric connection, locking said connected state at the same time, wherein said first connector comprises;

a locking plate to be moved between a connector locking position and a releasing position;

a holding element for holding said locking plate at said locking position;

a short-circuiting element provided on said locking plate; and

a plurality of short-circuiting terminals provided on a supporting plate opposing to said short-circuiting element,

while said second connector comprises a locking element to be engaged with said locking plate,

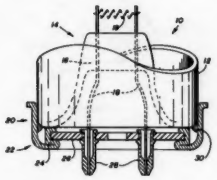
said short-circuiting element being brought into contact with said short-circuiting terminals when said connectors are in a mutually locked condition.

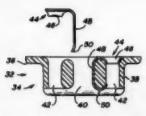
4,878,854

LAMP BASE

Donald M. Cannon, Dover, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Filed May 31, 1988, Ser. No. 200,217
Int. Cl.[4] H01R *33/02*
U.S. Cl. 439—236 4 Claims





1. An adapter for converting a fluorescent lamp bi-pin base to a recessed double contact base, said bi-pin base comprising a shell; a disk of insulating material secured to said shell; and a pair of base pins mounted on said disk, said pins being formed to receive the lead wires from a fluorescent lamp, said adapter comprising:

an insulating housing having a disk-shaped base and a boss projecting therefrom;

a central aperture in said boss;

a pair of peripheral apertures in said boss, one on either side of said central aperture and having a spacing corresponding to the spacing of said pair of base pins; and

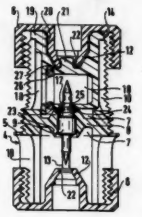
an electrical contact in each of said peripheral apertures, each of said contacts being fixed therein and including a portion which frictionally engages a base pin to provide electrical contact.

4,878,855

ELECTRIC CONNECTION TERMINAL FOR WIRES THAT ARE NOT PRIOR-STRIPPED

Jean-Paul Heng, Lyons; André Marmonier, Bron, and Etienne Brignet, Rillieux la Pape, all of France, assignors to Societe Anonyme dite: CGEE Alsthom, Perret, France

Filed Aug. 24, 1988, Ser. No. 235,600
Claims priority, application France, Sep. 22, 1987, 87 13069
Int. Cl.[4] H01R *4/24*
U.S. Cl. 439—411 7 Claims



1. An electrical connection terminal for power transport wires each constituted by a multi-strand conductor within insulation, said terminal comprising a rigid body provided with at least one threaded or tapped tubular end crossed transversely and at least in part by a wire-passing opening which is elongate in shape parallel to the longitudinal axis of said tubular end and whose width corresponds to a maximum diameter wire to be connected, together with a stopper including a central pusher and screwable onto the end of said tubular end, thereby closing said end, the central pusher moving into the tubular end progreesively as the stopper is tightened, said terminal also including at least one conductive spike having perforating end point projecting from a common wall, each point passing through the bottom of a wire-passing opening in one of the tubular ends for the purpose of enabling said spike to interconnect respective wires fixed in each end against the common wall within a tubular end into which the wire under consideration is engaged and in which it is fixed by a stopper whose central pusher arrives, when the stopper is screwed home, close to a perforating point with which said stopper is in alignment, said central pusher causing a wire to be pressed against the perforating point in alignment with the stopper by applying lateral pressure to the wire until said perforating point perforates the insulation and penetrates to come into contact with the central conductors strands of the wire, said terminal further comprising:

two tubular ends respectively provided on opposite sides of the common bottom wall with said tubular ends including respective wire-passing openings, said spike projecting on opposite sides of said common bottom wall into said openings and being situated on the alignment axis of said tubular ends,

a body provided with at least one hollow tubular end whose wire-passing opening is delimited by two diametrically opposite longitudinal notches disposed symmetrically

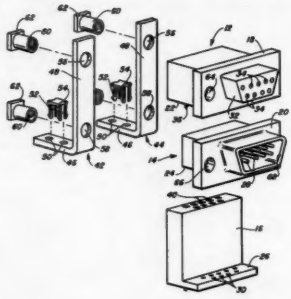
about a longitudinal mid-plane through said end, and further including a body provided with at least one tubular end having an outer thread which is provided on its inside with two diametrically opposite ribs disposed symmetrically about a longitudinal mid-plane perpendicular to the longitudinal mid-plane about which the longitudinal notches are symmetrical, said ribs serving in a first portion to center a wire to be connected relative to the perforating point of the spike which is disposed between them, and participating in a second portion in wedging said wire engaged on said perforating point.

4,878,856

BRACKETED STACKING OF MULTI-PIN CONNECTORS

Jack A. Maxwell, San Jose, Calif., assignor to Maxconn Incorporated, San Jose, Calif.

Filed Mar. 20, 1989, Ser. No. 326,029
Int. Cl.[4] H01R *9/09, 13/73*
U.S. Cl. 439—540 **14 Claims**



1. A stacked connector for electrically coupling a printed circuit board to first and second multi-pin external articles comprising,

a board-seatable connector member having a first face having means for selectively coupling said board-seatable connector member to a first multi-pin external article, said coupling means including a pair of mounting holes through said first face, said board-seatable connector member having a base wall perpendicular to said first face and further having a first set of angulate contacts originating at said first face and extending through said base wall for attachment to a printed circuit board,

spaced apart brackets attached to opposed sides of said board-seatable connector member, each bracket having a planar lower portion parallel to said base wall and an upper portion having an eyelet aligned with a mounting hole through said first face, and

a top connector member attached to the upper portion of said bracket and having a second face having means for selectively coupling said top connector member to a second multi-pin external article, said top connector member having a second set of angulate contacts originating at said second face and extending downwardly from said top connector member, and wherein each bracket is an L-shaped bracket, the planar lower portion of each L-shaped bracket being perpendicular to the upper portion.

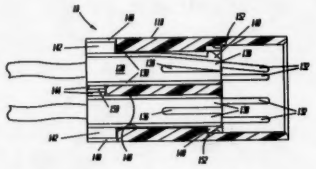
4,878,857

PIN ASSEMBLY

Douglas A. Neidich, Harrisburg, Pa., assignor to InterCon Systems, Inc., Harrisburg, Pa.

Filed Feb. 27, 1989, Ser. No. 315,831
Int. Cl.[4] H01R *13/506*
U.S. Cl. 439—599 **6 Claims**

1. A pin assembly for use in an electrical connector, the assembly including an elongate insulating body having a pair of generally parallel, flexible fingers at one end thereof, said fingers being separated by a slot permitting movement of said fingers toward and away from each other, a pair of generally parallel contact pins with one pin embedded within each finger, said pins extending outwardly beyond the ends of the fingers for engagement with disconnect terminals; two wires embedded within the body, said wires being electrically joined to the pins and extending outwardly from the other end of the body, and a latch on the end of one of the fingers extending away from the slot.

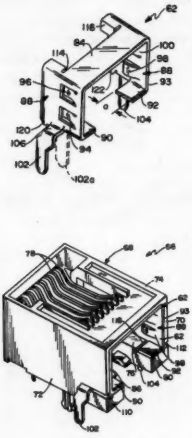


4,878,858

LOW PROFILE SHIELDED JACK

Helen M. P. Dechelette, Paris, France, assignor to Molex Incorporated, Lisle, Ill.

Filed Dec. 13, 1988, Ser. No. 283,670
Int. Cl.[4] H01R *13/648*
U.S. Cl. 439—607 **14 Claims**



1. A low profile shielded jack for mounting to a circuit board and for receiving a plug having an external shield thereon, said jack comprising:

a nonconductive housing having a board mounting wall, a plug mating face and a plurality of peripheral walls, said peripheral walls defining a plug receiving cavity extending into the mating face of said housing for receiving the shielded plug, said housing further being formed to define a pair of slots in proximity to the board mounting wall thereof;

a plurality of terminals mounted in said housing for making electrical contact with corresponding terminals on the

shielded plug mountable in the plug receiving cavity of said jack; and

an electrically conductive shield unitarily formed to define peripheral shield walls disposed in the plug receiving cavity of said housing, said peripheral shield walls being disposed substantially in face to face contact with the peripheral walls of said housing defining the plug receiving cavity therein, said peripheral shield walls further comprising a mating end disposed generally in line with the mating face of said housing, a plurality of spring contacts unitarily formed with said peripheral shield walls and resiliently extending inwardly in the plug receiving cavity of said housing for electrically contacting the shield on the shielded plug insertable in said plug receiving cavity, said shield of said jack further comprising a pair of board contacts extending through the slots in said housing and beyond the board mounting wall of said housing for electrically contacting a ground on the circuit board to which said shielded jack is mountable.

4,878,859

SUPPORT ASSEMBLY FOR AN ELECTRICAL TERMINAL HOUSING

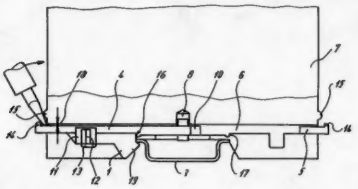
Bernd Haller, Detmold; Ernst Herkner, Lemgo; Peter Murray; Volker Riesenberg, both of Detmold; Michael Schnatwinkel, Herford; Rainer Schulze, Detmold; Georg Wagner, Oerlinghausen, and Manfred Wilmes, Detmold, all of Fed. Rep. of Germany, assignors to C. A. Weidmuller GmbH, Fed. Rep. of Germany

Filed Dec. 16, 1988, Ser. No. 285,064

Claims priority, application European Pat. Off., Jan. 30, 1988, 88101365.0

Int. Cl.[4] H01R *9/26*

U.S. Cl. 439—716 **12 Claims**



1. An assembly for supporting an electrical terminal bank on a carrier rail, comprising

(a) a terminal housing including a guide;

(b) a pair of slide members connected with said housing guide for sliding movement between latched and released positions, the thickness of said housing guide being slightly greater than the thickness of said slide members to define a gap therebetween;

(c) each of said slide members including a lower hook portion engaging a leg of the carrier rail when said slide members are in the latched position for connecting said terminal housing with the rail;

(d) spring means connected with said slide members for normally biasing said member hook portions toward the latched positions, respectively; and

(e) means for preventing unintentional movement of said slide members to said released positions including first and second abutment means connected with said housing and said slide members, respectively, said second abutment means being normally vertically offset from said first abutment means by the thickness of said gap, whereby when said housing is lifted with respect to said slide members, said gap is closed and said first and second abutment means are arranged opposite each other to prevent lateral movement of said slide members toward the released positions.

4,878,860

CONNECTION ARRANGEMENT BETWEEN CONTROL DEVICE AND SIGNAL TRANSMISSION DEVICE

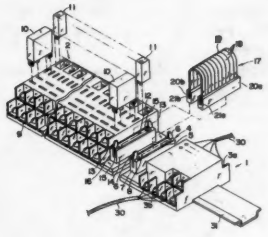
Kazushige Matsuoka, Osaka, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Feb. 5, 1988, Ser. No. 153,295

Claims priority, application Japan, Feb. 6, 1987, 62-26955

Int. Cl.[4] H01R *9/26*

U.S. Cl. 439—716 **28 Claims**



1. A connection arrangement comprising:

a control device adapted for being connected by a plurality of electrical connecting elements as many as the number of a plurality of information signals to be transmitted;

a signal transmission device for transmit and receive signals with the control device,

wherein said signal transmission device is connected between a main station and said control device,

wherein said signal transmission device has a first converting means for converting an input signal from said main station into a control signal readable by said control device, and

wherein said signal transmission device has a second converting means for converting a signal from said control device into a transmission signal readable by said main station; and

connecting means for connecting the control device and the signal transmission device,

wherein said connecting means includes a first connector provided for at least either one of the control device and the signal transmission device and a second connector which can be attachably and detachably connected with the first connector, and

wherein said connecting means is used to connect said control device and said signal transmission device and is used for transmitting a number of information signals.

4,878,861

COMPLIANT ELECTRICAL CONNECTOR PIN

Jerry A. Kendall, and David M. Webb, both of Lewisville, Tex., assignors to Elfab Corporation, Lewisville, Tex.

Filed Nov. 1, 1988, Ser. No. 265,782

Int. Cl.[4] H01R *13/42*

U.S. Cl. 439—751 **7 Claims**

1. A compliant electrical connector pin for press-fit connection to a hole in a circuit board, the pin comprising:

a tail section; and

an enlarged compliant section of generally rectangular cross-section, two generally V-shaped troughs formed in opposing faces of the compliant section to form two flange members, each trough having a bottom, including a generally flat bottom face, the flat bottom faces of the troughs

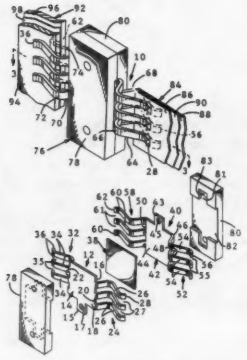
forming therebetween a compressible web member connecting the two flange members, and the bottom of each trough further intersects barrier walls extending substantially normal to the generally flat bottom face.

4,878,862

CONNECTOR FOR MATING TWO BUS BARS

James H. Wise, Palmyra, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 5, 1988, Ser. No. 280,108
Int. Cl.[4] H01R *13/10*
U.S. Cl. 439—787 18 Claims



1. An electrical connector for mating two blade-shaped members, each having opposed first and second sides, said connector comprising:

first and second terminal elements having body sections secured together with insulating means therebetween, each said body section including inwardly and outwardly facing major surfaces and leading and trailing edges;

each said first and second terminal element having a first array of spaced cantilevered spring contact arms extending outwardly from a respective said leading edge, and a second array of spaced cantilevered spring contact arms extending outwardly from a respective said trailing edge, said spring contact arms of both said first and second arrays of each said terminal element extending outwardly from the plane of the respective said body sections toward the other said terminal element and into the spacing between said contact arms of said arrays of said other terminal element;

said spring contact arms of said first arrays defining a first blade-receiving receptacle between free ends thereof, and said spring contact arms of said second arrays defining a second blade-receiving receptacle between free ends thereof, said first and second blade-receiving receptacles being aligned with said secured together body sections and having first and second sides corresponding to said body sections of said first and second terminal elements respectively;

said free ends of said spring contact arms of said first and second arrays of said first terminal element being disposed along said second side of said first and second blade-receiving receptacles respectively and adapted to be deflected outwardly by corresponding second sides of respective first and second mating blade-shaped members; and

said free ends of said spring contact arms of said first and second arrays of said second terminal element being disposed along said first and second blade-receiving receptacles respectively and adapted to be deflected outwardly by corresponding first sides of respective first and second mating blade-shaped members; whereby

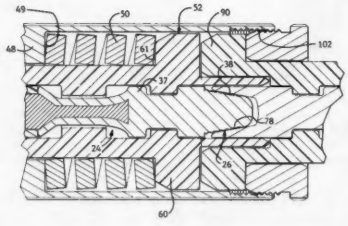
deflection of the free ends of the contact arms of each terminal element during connector mating by first and second blade-shaped members urges the body section of one terminal element more tightly against the body section of the other terminal element.

4,878,863

ELECTRICAL CONNECTOR AND CONTACT TERMINAL THEREFOR

Robert C. Swengel Jr., York, and James H. Wise, Palmyra, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 22, 1988, Ser. No. 288,748
Int. Cl.[4] H01R *13/52*
U.S. Cl. 439—884 23 Claims



1. A pin terminal member for mating with a complimentary socket terminal member, said pin terminal member comprising:

a forward portion including contact means therearound defining a tapered contact surface, said surface having an array of facets disposed in selected areas along said surface, the outer surface portions of said facets defining a plurality of small contact areas;

said forward portion being adapted to conform to an complimentary inner tapered surface of a mating socket terminal member; whereby

upon mating of said pin and socket terminal members and urging said pin and socket terminal members together, said facets provide a multitude of macrocontactasperities between said pin terminal contact areas and said inner socket terminal surface to establish a plurality of essentially parallel circuit paths for current passing through said mated terminal members thus decreasing the constriction resistance of the mated members.

4,878,864

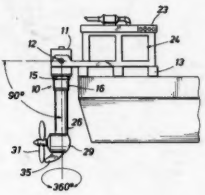
OUTBOARD THRUSTER WITH DIRECT DRIVE HYDRAULIC MOTOR

Fransiscus C. A. Van Bentem, 3010 Apple Valley Ln., Missouri City, Tex. 77459

Continuation of Ser. No. 879,972, Jun. 30, 1986, abandoned. This application Mar. 9, 1988, Ser. No. 169,103

Int. Cl.[4] B63H *21/165*

U.S. Cl. 440—5 **8 Claims**



1. A compass-type outboard marine thruster apparatus, comprising: a horizontally disposed base adapted to be rigidly mounted to the deck of a marine vessel; a housing; spaced-apart trunnions on opposite sides of said housing for mounting said housing on said base for pivotal movement about a horizontal pivot axis and for suspending said housing rearwardly of the stern of said vessel; a bearing head connected to the lower end of said housing; an elongated tubular structure having an upper section that extends upwardly within and through said head, the longitudinal axis of said tubular structure being in the same plane with and at a right angle to said horizontal pivot axis; bearing means for mounting said tubular structure for rotation with respect to said head and said housing; propeller hub means fixed to the lower end of said tubular structure; hydraulic motor means mounted in said hub means and having an output shaft; propeller means coupled to said output shaft; and hydraulic lines extending from said motor means up through said tubular structure and into said housing to a location above the upper end of said upper section for conveying hydraulic fluid under pressure to and from said motor means.

4,878,865

OUTBOARD PROPULSION UNIT SUPPORTING SYSTEM FOR BOAT

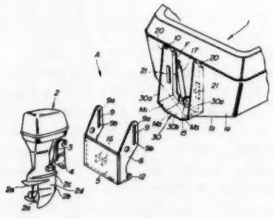
Novuo Makihara; Hiroshi Ono, and Norimasa Kawamura, all of Yokosuka, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 7, 1987, Ser. No. 129,561

Claims priority, application Japan, Apr. 16, 1987, 62-57899[U]

Int. Cl.[4] B63H *1/28*

U.S. Cl. 440—66 **19 Claims**



1. An outboard propulsion unit supporting system for a boat, comprising:

first and second transom brackets secured to a boat transom and positioned spaced from each other to support an outboard propulsion unit;

first and second deflector side plate sections which are respectively integral with said first and second transom brackets and extend downwardly and rearwardly relative to the boat transom; and

a deflector bottom plate section connecting said first and second deflector side plate sections, said deflector bottom plate section extending rearwardly relative to the boat transom and positioned between said boat and the outboard propulsion unit, said deflector bottom plate section including a generally flat portion which is generally horizontal relative to the boat and positioned at a central part of the deflector bottom plate section, said flat portion being located below the level of a splash plate of the outboard propulsion unit and extending generally in directions of width and length of the boat;

said first and second deflector side plate sections and said deflector bottom plate section constituting a deflector for rearward water flow from the boat.

4,878,866

THERMIONIC CATHODE STRUCTURE

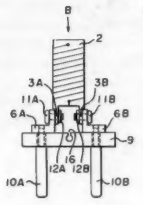
Yoshiharu Mori, Tsuchiura; Suzuya Yamada, Machida; Mitsuaki Saito, Machida; Hirotoshi Hagiwara, Machida, and Kenichi Ehara, Shibukawa, all of Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 55,379, May 29, 1987. This application Jul. 22, 1988, Ser. No. 222,300

Claims priority, application Japan, Jul. 14, 1986, 61-163859; Jan. 19, 1987, 62-4924; Feb. 12, 1987, 62-17800; Mar. 3, 1987, 62-46718

Int. Cl.[4] H01J *9/04*

U.S. Cl. 445—36 **5 Claims**



1. A method of making a thermionic cathode structure comprising the steps of:

cutting by a wire cut method a heat resistant and electrically conducting inorganic tubular substrate such that two parallel thermionic electron emitting elements are formed in a reverse-helical manner which are arranged so that their emissive surfaces are parallel to each other and wherein one end of each said elements is connected to the one end of the other elements and providing current feeding ports on the remaining end of each of said elements.

4,878,867

COIN BANK

Ralph M. Dworman, and Nancy S. Dworman, both of Worcester, Mass., assignors to Ralphco Inc., Worcester, Mass.

Filed Jul. 29, 1988, Ser. No. 226,072

Int. Cl.[4] A45C *1/12;* **B65D** *3/10, 43/08;* **A63H** *33/30*

U.S. Cl. 446—8 **3 Claims**

1. A coin bank comprising:

(a) a cylindrical tubular intermediate portion which has a vertical central longitudinal axis, a circular inner surface, a circular outer surface, a top end with a top opening and a bottom end with a bottom opening,

(b) a cap portion which has a hollow interior, a top surface

a cylindrical lower end which fits snugly within the top end of said intermediate portion so that said cap portion is removably attached to the top end of said intermediate portion, a bottom opening at said lower end, a circular intermediate outer surface having an outer diameter which is the same as the outer diameter of the circular outer surface of said intermediate portion so that when said cylindrical lower end is inserted within said intermediate portion, the circular intermediate outer surface of said cap and the circular outer surface of said intermediate portion define a single continuous outer surface, a conical

outer surface which tapers inwardly from said intermediate outer surface to said top surface, and a coin slot in said conical surface to the interior of said cap portion,

(c) a base portion which has a bottom wall and a cylindrical upper end which is removably attached to the bottom end of said intermediate portion, said cylindrical upper end having a top opening so that a coin which is inserted into said slot falls through the bottom opening of said cap portion, through the intermediate portion and through the top opening of said base portion to said portion to said bottom wall.

4,878,868

SWINGING BOB TOY

Laurence J. Shaw, 595 Fairway Dr., Novato, Calif. 94947

Filed Apr. 17, 1989, Ser. No. 339,340

Int. Cl.[4] A63H *33/00*

U.S. Cl. 446—75 **17 Claims**

1. A toy comprising:

(a) a flexible elongated tethering means,

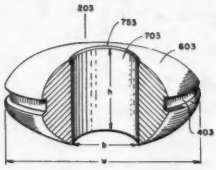
(b) a first mass secured to said tethering means, and

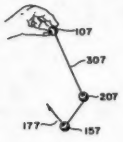
(c) a second, movable mass having a bore with a height h and a width b, the bore of said movable mass allowing said movable mass to move freely along said tethering means, and said second, movable mass having an outer width w, such that

$0.2 < h/w$

and

$(h/w) - (b/w) < 0.8$,





whereby the operation of said toy is smooth and the tangling of said tethering means is infrequent.

4,878,869

TOYS HAVING MAGNETIC SWITCHES

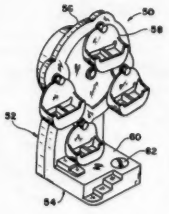
Yuji Yamane, and Hideya Nishikawa, both of Tokyo, Japan, assignors to Tomy Kogyo Co., Inc., Tokyo, Japan

Filed Jun. 9, 1988, Ser. No. 204,342

Claims priority, application Japan, Oct. 22, 1987, 62-161715

Int. Cl.[4] A63H *33/26, 13/20;* **F17D** *19/00*

U.S. Cl. 446—130 **8 Claims**



1. A toy comprising:

a body;

a movable element connected to the body;

spring mechanical drive motor means with rotary release means, and being operatively connected to the movable element for moving the movable element;

an actuator for selectively contacting and releasing the rotary release means;

a first magnetic member linked to said actuator; and

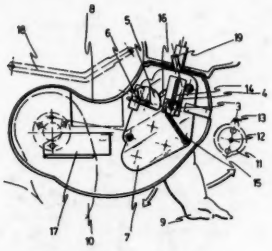
a second magnetic member for placement in contact with the body and being operative to move the actuator into and out of contact with the rotary release means by magnetic attraction with the first magnetic member, so that when the actuator is out of contact with the rotary release means, the drive motor outputs a rotary driving force to the movable element.

4,878,870

ALL-FOURS WALKING DOLL

Vincente N. Pastor, Onil, Spain, assignor to Vicma, S.A., Onil, Spain

Filed Feb. 19, 1988, Ser. No. 158,254
Int. Cl.[4] A63H *3/28, 3/24, 3/22*
U.S. Cl. 446—298 **5 Claims**



1. An all-fours walking doll toy that periodically falls down on a horizontally disposed body portion comprising:

movable arm and leg parts, connected to the body portion, that support the body portion and cause the doll to walk on all-fours;

an electrically powered drive mechanism within the body connected to at least one rotatable cam having a convex surface and a flat surface;

at least one rotatable plate connected to the drive mechanism and the arm part of the doll so as to cause the arm part to move, said rotatable plate is movable between a first position in which an elastic means within the body portion and connected to the plate urges an appendix of the plate against the convex surface of the cam so as to maintain the arm part in a generally upright position, and a second position in which the appendix loses contact with the cam when the rotation of the cam by the drive mechanism causes the flat surface of the cam to be positioned adjacent to the appendix so that the elastic means can rotate the plate and cause the arm part to extend forward so that the doll acquires a headlong-fallen position;

a swivel mechanism connected to the drive mechanism and a head part of the doll so as to cause the head part to alternately swivel sideways as the doll walks on all-fours; and

a connecting, means between the plate and the leg part, so as to move the leg part in conjunction with the arm part.

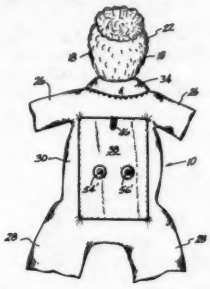
4,878,871

TOY FOR CONVEYING PERSONALIZED MESSAGE

Nancy C. Noto, 26 Castle Rock, Branford, Conn. 06405

Filed Apr. 22, 1988, Ser. No. 184,761
Int. Cl.[4] A63H *5/00, 3/28, 3/02;* **G09B** *50/60*
U.S. Cl. 446—302 **6 Claims**

1. A toy having a cavity containing a cassette player, a battery holder, a switch with an operative push button, electric circuit means interconnecting said player, said holder and said switch, and a flap that is movable between a closed position in which said flap covers said cavity and an open position in which said cavity is exposed, whereby a sender can tape a personal message on a cassette, insert the cassette in said player with said flap in the open position, close said flap and give the toy a recipient with the message-bearing cassette therein, wherein said switch is so positioned that, when said flap is in said closed position, said push button will engage said flap to



produce a bulge therein, whereby said switch can be operated without moving said flap to said open position.

4,878,872

ADJUSTABLE ANIMAL APPEARING TOY

Cynthia L. Johnson, HCR 61, Box 12, North Amity, Me. 04465

Filed Sep. 7, 1988, Ser. No. 241,361
Int. Cl.[4] A63H *3/12, 3/00*
U.S. Cl. 446—321 **4 Claims**

1. An adjustable animal or creature-appearing toy comprising

a plurality of discs of identical diameter arranged side by side on a common axis,

means hinging the discs to each other on an axis offset from said common axis for individual swinging movement of each disc independently of the others, and

indicia on the exposed side of each endmost disc depicting facial features of a selected animal or creature, the intermediate discs being of different selected colors resembling those of the selected animal and being composed of relatively stiff material and said end discs being relatively thicker than said intermediate discs and being provided with a textured surface,

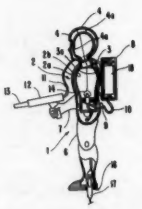
whereby, when said discs are selectively swung through different predetermined arcs about said offset axis, they suggest to the viewer the body of said animal or creature facing toward or away from the viewer.

4,878,873

DOLL TOY

Hidehiko Yamaguchi; Kouichi Minami, and Nobuo Kobayashi, all of Tokyo, Japan, assignors to Tomy Kogyo Co., Inc., Tokyo, Japan

Filed Jan. 21, 1988, Ser. No. 146,392
Claims priority, application Japan, Jan. 22, 1987, 62-7880[U]
Int. Cl.[4] A63H *3/36*
U.S. Cl. 446—321 **9 Claims**



1. A doll toy comprising:

a head member having a first interior space;

a trunk member having a second interior space and being connected to the head member, the first interior space being in communication with the second interior space;

wherein the head member and the trunk member constitute portions of an outer shell body of the doll toy;

frame means which includes a pattern and being disposed within the outer shell body, for projecting a desired pattern onto the outer shell body, the frame means being transparent and hollow; and

a light source disposed within the frame means for providing illumination light to project images from the patterned frame means onto the outer shell body,

wherein the frame means is a plurality of transparent frames, each made of a transparent material and including a pattern for displaying images.

4,878,874

SELECTIVELY ROCKING OR WALKING DOLL

Rouben T. Terzian, Chicago, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Filed Feb. 9, 1989, Ser. No. 309,635
Int. Cl.[4] A63H *11/18*
U.S. Cl. 446—355 **3 Claims**

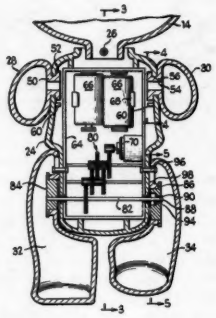
1. A character comprising in combination:

a torso having a front and a back plus a top and a bottom;

legs mounted on the torso for pivotal movement between front and back positions along with simultaneous limited up and down movement;

a reversible motor contained in the character; and

means for selectively articulating the legs through their pivotal movement between front and back positions along with simultaneous limited up and down movement either in phase or out of phase with each other in response to



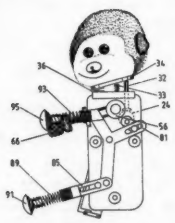
operation of the reversible motor in one direction or in the opposite direction.

4,878,875

NOVEL CLIMBING TOY

Lin Pin-Hung, 5F, No. 5, Lane 59, Sec. 3, and Yu Kao-Hsien, Room 506, 5F, No. 54, Sec. 1 Chung Hsiao E. Road, both of Taipei, Taiwan

Filed Nov. 16, 1987, Ser. No. 121,110
Int. Cl.[4] A63H *11/00*
U.S. Cl. 446—356 **8 Claims**



1. A climbing toy animal having a body and limbs, the climbing toy animal being intended to climb up a fabric, such as the clothing worn by a person, comprising:

a motor disposed within the body;

a source of power to energize the motor;

a means for moving the limbs to simulate climbing; and

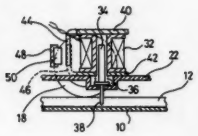
a climbing mechanism driven by the motor and including means which alternately clamp and release the person's clothing, thereby enabling the toy animal to climb up the person.

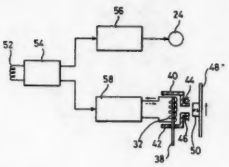
4,878,876

APPARATUS FOR CHANGING THE RUNNING TRACK OF A RACING TOY

Zenichi Ishimoto, Tokyo, Japan, assignor to Nikko Co., Ltd., Tokyo, Japan

Filed Jul. 19, 1988, Ser. No. 221,466
Claims priority, application Japan, Sep. 12, 1987, 62-227560
Int. Cl.[4] A63H *18/00, 30/02, 33/26*
U.S. Cl. 446—446 **3 Claims**





1. Apparatus for changing the running track of a running toy car, in which a motor-driven running toy car body runs on a base having a plurality of parallel guide tracks, said body having a guide pin engageable in any selected one of said tracks, the running body having an electromagnetic coil for disengaging said guide pin from a said track and spring means to urge said guide pin into a said track, said electromagnetic coil having oppositely polarized yokes at opposite ends thereof, said yokes having protuberant portions comprising magnetic poles which are of opposite polarity when said coil is energized, said protuberant portions being disposed side by side of each other in one direction, steering linkage swingably connected with wheels of said running body to steer said running body, said linkage having a magnet thereon which is disposed adjacent said protuberant portions of said yokes and is movable parallel to said one direction, whereby energization of said coil simultaneously moves said guide pin out of one said track and moves said magnet and linkage to steer said running body into the path of another track, whereupon the deenergization of said coil permits said spring means to enter said pin into said another track.

4,878,877

PLUG-IN MODULE FOR MOTORIZED TOY VEHICLE

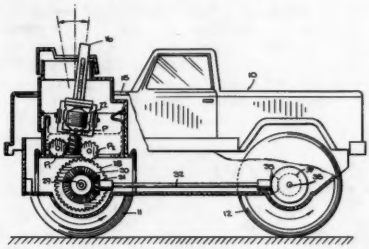
Robert T. Auer, East Stroudsburg, Pa., and David Reina, Maplewood, N.J., assignors to Buddy L Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 122,253, Nov. 16, 1987. This application Sep. 9, 1988, Ser. No. 242,265
Int. Cl.[4] A63H *29/24, 29/20, 17/26*; F16H *3/34*
U.S. Cl. 446—463 **7 Claims**

1. A power module adapted to be installed in an open compartment in the body of a motorless toy vehicle to drive the vehicle in a desired direction, said compartment being disposed above a coupling gear operatively linked to a drive wheel, the module comprising:

A. a case having a base and housing a battery supply; and

B. a DC motor and gear assembly pivotally supported within the case having a control lever attached thereto which normally is positioned in a neutral non-driving mode, the lever being selectively shiftable either to a forward mode for driving the vehicle in the forward direction in which the assembly is then inclined with respect to the neutral mode, or to a reverse mode for driving the vehicle in the opposite direction in which the assembly is then oppositely inclined, said assembly being provided with a worm gear on a shaft of the motor and a pair of drive pinions engaging the worm gear on either side thereof, said pinions being positioned at an opening in said base adjacent said coupling gear, whereby when the motor is connected to said supply, the pinions are caused to rotate concurrently in opposite directions, only one of said pinions engaging the coupling gear in the forward mode and only the other pinion engaging the coupling gear in the reverse mode, both pinions being disengaged from the coupling gear in the neutral mode.

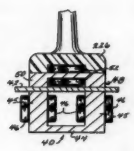


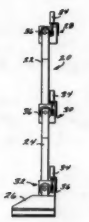
4,878,878

METHOD AND APPARATUS FOR STABILIZING AND POWERING WALKING ANIMATED FIGURES

Ronny E. Bittner, LaVerne, Calif., assignor to The Walt Disney Company, Burbank, Calif.

Filed Feb. 24, 1987, Ser. No. 17,635
Int. Cl.[4] A63H *33/26, 3/22, 3/20*
U.S. Cl. 446—139 **2 Claims**





1. In an animated figure which simulates walking of the type wherein jointed appendages are rotatably mounted to a frame and selectively lifted off a platform surface by the interaction of a plurality of electronically controlled drive motors and gears, an improvement which comprises:

first electromagnetic means secured to a jointed appendage for (1) generating a stabilizing holding force, and (2) in-

ductively receiving an energization signal and command signals; and

second electromagnetic means secured to a platform beneath said platform surface and adapted to be energized by a direct current for selectively interacting with said first electromagnetic means for stabilizing said figure by selective magnetic attraction therebetween, said second electromagnetic means being further adapted to be energized by (1) an alternating current, and (2) a modulated current for transmission of said energization and command signals to said first electromagnetic means, said electromagnetic means includes a plurality of electromagnet elements arranged in a matrix, each of said plurality of elements being selectively energized and deenergized for providing said stabilization of said figure and said signals.

4,878,879

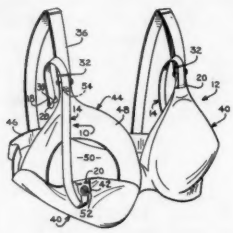
CLOSURE DEVICE FOR NURSING BRA

Maria A. Kunstadter, 1708 Bluebell, Liberty, Mo. 64068

Filed Dec. 30, 1988, Ser. No. 292,108

Int. Cl.[4] A41C *03/04*

U.S. Cl. 450—36 **5 Claims**



1. A closure device for a nursing bra having a releasably securable breast-enveloping cup and a supporting bra strap, said closure device comprising:

an elongated flexible strip presenting a first end and a second end;

means for releasably attaching the strip to the cup at said first end;

means for releasably attaching the strip to the bra strap and for enabling the strip to move slidably relative to the bra strap, said attaching means being positioned intermediate the first end and the second end; and

stop means attached to the second end for inhibiting the second end from sliding through said bra strap attaching means.

4,878,880

CLUTCH APPARATUS

Jack L. Williams, Orange, Calif., assignor to ITT Corporation, New York, N.Y.

Continuation of Ser. No. 87,579, Aug. 20, 1987, abandoned. This application Nov. 16, 1988, Ser. No. 274,637

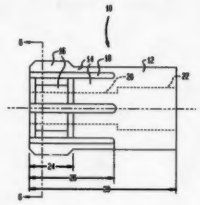
Int. Cl.[4] F16D *7/04*

U.S. Cl. 464—37 **3 Claims**

1. A two piece slip clutch, each piece being molded in plastic and having a unitary configuration, the clutch comprising:

an inner rotary member including a cylindrical hub portion having an inner hub diameter and an outer hub diameter, a plurality of beam members axially extending from said hub portion, said beam members being uniformly shaped and separated by equal interdigital spaces, and said beam members having tooth projections and a cylindrical inner diameter which is smaller than said inner hub diameter;

a cylindrically shaped rotary outer member having a plurality of cavities on the inner peripheral surface at least equal said beam members and a hub mounting portion, said cavities being formed for coupling engagement with said tooth projections, the maximum diameter of a pair of oppositely located cavities is less than the maximum outer diameter of a pair of oppositely located tooth projections,



and when the outer member is subjected to an overload condition, said beam members flex inwardly toward the center and the tooth projections slip to the next adjacent cavity.

4,878,881

FIXED HOMOKINETIC JOINT FOR TRANSMISSIONS OF DRIVING WHEELS OF AUTOMOBILE VEHICLES

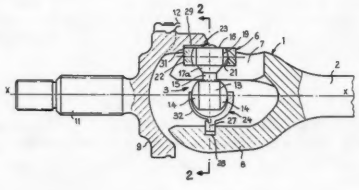
Jean-Claude Van Dest, Saintry sur Seine, France, assignor to Glaenzer-Spicer, Poissy, France

Filed Oct. 6, 1988, Ser. No. 254,083

Claims priority, application France, Oct. 6, 1987, 8713766

Int. Cl.[4] F16D *3/30*

U.S. Cl. 464—111 **9 Claims**



1. A fixed homokinetic joint for driving wheel transmissions of automobile vehicles, said joint having a general axis and comprising:

a tulip element for connection to a drive shaft, said tulip element having three axially extending petal portions, each said petal portion defining a rolling track;

a tripod element having three radial arms;

a plurality of rollers, each said roller having an inner spherical bearing surface, and each said roller cooperative with a respective said rolling track on said petal portions;

spherical sectors carried by each said radial arm and cooperative with a said inner spherical bearing surface of a re-

spective said roller, said spherical sectors of each said radial arm having flat surfaces defined therebetween;

a bowl element for connection to a wheel stub-axle, said bowl element fixed to said tripod element; and

means for axially connecting said tulip element to said tripod element;

said tripod element comprising a central ball, each said radial arm of said tripod element comprising a portion off-center in a radial plane relative to said central ball;

said means for axially connecting said tulip element to said tripod element comprising a central spider element having three branches adapted to cap, in a radially floating manner, said central ball of said tripod element, and means for axially retaining said branches of said spider element in said tulip element such that said spider element has two degrees of freedom, radially relative to said tulip element and rotationally with said tulip element about said general axis.

4,878,882

CROSS GROOVE CONSTANT VELOCITY RATIO UNIVERSAL JOINTS

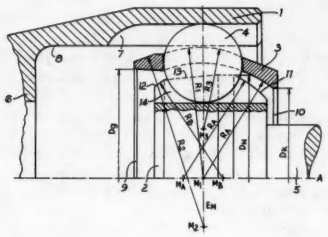
Hans-Heinrich Welschof, Rodenbach, and Peter Schwärzler, Glattbach, both of Fed. Rep. of Germany, assignors to Löhr & Bromkamp GmbH, Offenbach am Main, Fed. Rep. of Germany

Filed Apr. 4, 1988, Ser. No. 176,849

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1987, 3710572

Int. Cl.[4] F16D *3/21*

U.S. Cl. 464—144 **17 Claims**



1. A cross groove constant velocity ratio universal joint, comprising:

an outer joint member;

an inner joint member;

the inner and outer joint members having circumferentially disposed axially extending facing pairs of grooves, the grooves of each pair being oppositely inclined to the rotational axes of their joint members so that they cross one another as viewed in a direction transverse to said axes;

a plurality of balls disposed one in each facing pair of grooves, for torque transmission between the joint members;

and a cage of annular form disposed between the joint members, the cage having apertures wherein the balls are received to constrain the balls such that their centers occupy a ball center plane;

wherein, as viewed in longitudinal section, the cage is asymmetrical and has at one end an opening of a diameter greater than a maximum diameter of the inner joint member, and at its other end has an opening of a diameter smaller than said maximum diameter of the inner joint member, so that the cage can be fitted axially over the inner joint member from said one end thereof, and said other end of the cage forms a stop for limiting relative axial movement between the cage and inner joint member, the external surface of the cage comprising a number of longitudinally extending portions of different configuration from one another, the portions including a first portion, towards the end of the cage having the larger diameter opening, and a further portion towards the end of the cage having the smaller diameter opening, both of which portions are convex surfaces of revolutions about the longitudinal axis of the cage and which, as viewed in longitudinal section of the cage, having centers of curvature which lie in the ball center plane but which are offset from said cage axis, the first portion having a radius of curvature greater than that of the further portion.

4,878,883

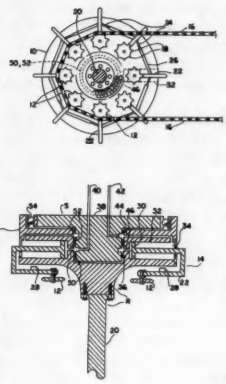
CONTINUOUSLY VARIABLE CHAIN DRIVE TRANSMISSION

Thomas K. Wheless, 1570 W. Maggio Way, Bldg. 24, Apt. 2055, Chandler, Ariz. 85224

Filed Dec. 8, 1988, Ser. No. 281,527

Int. Cl.[4] F16H *55/54*

U.S. Cl. 474—51 **4 Claims**



1. A sprocket wheel and control mechanism for a chain or belt drive transmission with a continuously adjustable mechanical advantage comprising:

said sprocket wheel of said chain or belt drive transmission having variable effective diameters about a center including a plurality of pairs of diametrically opposed sprocket, spur and/or friction gears adapted for engagement with a chain or belt of said transmission;

hydraulic piston and cylinder assemblies activated by a flow of fluid, each of said assemblies controlling the variable effective diameters by displacement of each of said sprocket, spur and/or friction gears from the center of the sprocket wheel by control of said flow of said fluid to said assemblies and from said assemblies;

equalization means for tending to synchronously form uniform effective diameters by equalizing the displacement of said sprocket, spur and/or friction gears from the center of the sprocket wheel at any instant of time; and

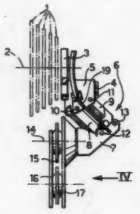
valve means for controlling said flow of said fluid to said assemblies and from said assemblies, said valve means having as one of a plurality of possible positions a neutral position for stabilizing said fluid in said piston and cylinder assemblies to stabilize the displacement of the sprocket, spur and/or friction gears and having, as the others of said positions, positions for moving said sprocket, spur and/or friction gears.

4,878,884

REAR DERAILLEUR FOR BICYCLE GEARS

Antonio Romano, Padua, Italy, assignor to Campagnolo S.p.A., Venice, Italy

Filed Aug. 31, 1988, Ser. No. 238,427
Claims priority, application Italy, Sep. 4, 1987, 67761 A/87
Int. Cl.[4] F16H *11/08*
U.S. Cl. 474—82 **3 Claims**



1. A rear derailleur for bicycle gears, comprising an upper body which can be fixed to the bicycle frame, a lower body carrying transmission means for the bicycle chain, and an articulated parallelogram joint which connects the lower body to the upper body, the joint including a pair of connecting rods whose ends are articulated to the upper body and to the lower body respectively,

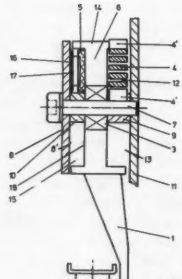
wherein the axes of articulation of the two connecting rods to the upper body are inclined to the longitudinal plane of the bicycle in the position of mounting of the derailleur on the bicycle, and are arranged with one outwardly of higher than the other so that the plane containing the axes is inclined to the axis of the rear wheel of the bicycle.

4,878,885

TENSION ARRANGEMENT FOR TRANSMISSION BELTS

Manfred Brandenstein, Eussenheim, and Jurgen Kober, Schwebeim, both of Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Feb. 12, 1988, Ser. No. 155,261
Claims priority, application Fed. Rep. of Germany, Feb. 13, 1987, 3704521
Int. Cl.[4] F16H *7/08*
U.S. Cl. 474—135 **7 Claims**



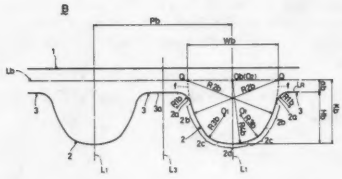
1. In a tension arrangement for transmission belts, including a pivot arm, a tension roller mounted at one end of the pivot arm, a pivot bearing mounted at the other end of the pivot arm, a torsion spring coaxial to the pivot bearing and mounted to act between the pivot arm and a fixed machine part, and a pivot movement damping friction element having friction surfaces extending substantially over its entire circumference and inserted in an annular space bounded by opposite surfaces the improvement comprising; means for prestressing the friction element between said opposite surfaces with a first amplitude of force in one direction of pivot movement of the arm and for prestressing said friction element with a second amplitude of force greater than said first amplitude in the other direction of pivot movement of the arm.

4,878,886

TOOTHED BELT AND POWER TRANSMISSION DEVICE USING THE SAME

Masayuki Kitabayashi, and Michio Tanaka, both of Kobe, Japan, assignors to Bando Chemical Industries, Ltd., Kobe, Japan

Filed Jan. 23, 1989, Ser. No. 299,688
Int. Cl.[4] F16G *1/00*
U.S. Cl. 474—204 **8 Claims**



1. A toothed belt having an endless belt body made of elastomer material, tensile members embedded in said belt body extending longitudinally thereof along a belt pitch line and a plurality of teeth integrally formed with said belt body along an inner periphery thereof at a certain pitch Pb adapted for engaging with a toothed pulley in pulley grooves thereon;

said belt teeth being separated by belt cavity portions, each belt tooth being symmetrical about a belt tooth center line in longitudinal cross-section, each said belt cavity portion being symmetrical about a belt cavity portion center line in longitudinal cross-section;

each said belt tooth being divided into four regions in longitudinal cross-section from a tooth root to a tooth tip, a pair of opposed tooth root portions occupying a first region, a pair of convex arcuate tooth flank portions which extend from ends of said tooth root portions toward said tooth tip occupying a second region, a pair of convex arcuate tooth top portions which extend from ends of said tooth flank portions toward said tooth tip occupying a third region, and a tooth tip portion which connects ends of said tooth top portions occupying a fourth region, all said portions being connected so as to be formed in a continuous curvature;

each said belt tooth having a width Wb at tooth root measured between intersections Q and Q at which the belt pitch line intersects imaginarily extended arcs of said tooth flank portions from conjunctive points thereof with said tooth root portions in longitudinal cross-section, wherein the width Wb at tooth root is predetermined to be in a range of 0.3–0.8 times as long as the belt tooth pitch Pb;

each said tooth root portion of said belt tooth being formed in a first circular arc with a radius R_1 b connecting said tooth flank portion to a base part of said belt cavity portion in both sides of the belt tooth center line, wherein said base part in longitudinal cross-section is a line coinciding with a belt land line which is colinear with base parts of other belt caavity portions on said belt;

each said tooth having a tooth height Hb measured between an extremity of said tooth tip portion and the belt land line

on the belt tooth center line, wherein the tooth height Hb is predetermined to be higher than a groove depth dimension of said pulley groove;

each said tooth flank portion being formed in a second circular arc with a radius R_2 b equal to the width Wb at tooth root whose center lies on the intersection Q between the belt pitch line and the imaginarily extended arc of the opposite tooth flank portion from the belt tooth center line;

said tooth tip portion being formed in a fourth circular arc whose center lies on the belt tooth center line and whose radius R_4 b is predetermined to be in a range given by a following inequality,

$$R_4 b > \{(Wb/2)^2 + Kb^2 - (R_2 b)^2\}/4\,(Kb - R_2 b)$$

(wherein reference Kb is a distance measured between said extremity of said tooth tip portion and the belt pitch line.); and

each said tooth top portion being formed in a third circular arc whose center lies on a point (x, y) apart from the belt tooth center line in the same side as said tooth top portions, the location of the point (x, y) being expressed by following equations in an x-y coordinate system which is composed of an origin on an intersection between the belt pitch line and the belt tooth center line, x axis extending along the belt pitch line in a direction toward said tooth top portions in question from the belt tooth center line and y axis extending along the belt tooth center line in a direction toward saidi tooth top portions from the belt pitch line,

$$x = -(Wb/2) + (R_2 b - R_3 b)\cos\theta$$

$$y = (R_2 b - R_3 b)\sin\theta$$

wherein

$$\theta = \sin^{-1}\{4T_A/(R_2 b - R_3 b)\cdot Wb\}$$

$$T_A = \{\, T_S \cdot (T_S - R_2 b + R_3 b)\cdot (T_S - R_4 b + R_3 b)\cdot (T_S - Wb/2)\,\}^{\frac{1}{2}}$$

$$T_S = (R_2 b + R_4 b - 2R_3 b + Wb/2)/2$$

and whose radius R_3 b is predetermined to be in a range given by follwoing inequalities:

$$R_3 b > \{(Wb/2)^2 + Kb^2 - (R_2 b)^2\}/4(Kb - R_2 b)$$

$$R_3 b < \{(Wb/2)^2 + Kb^2 - (R_2 b)^2\}/2(Kb - R_2 b).$$

4,878,887

ENDLESS TRANSMISSION BELT

Shiro Sakakibara; Yoshinori Miyaishi, both of Aichi, and Yoshiaki Kano, Gifu, all of Japan, assignors to Aisin-Aw Kabushiki Kaisha, Japan

Filed Dec. 21, 1988, Ser. No. 287,322

Claims priority, application Japan, May 17, 1988, 63-118188

Int. Cl.[4] F16G *1/22*

U.S. Cl. 474—245 **10 Claims**

1. An endless transmission belt comprising:

a plurality of sets of link plates;

a plurality of pin pairs, each pair of pins linking one end of one set of link plates to an adjacent end of another set of link plates;

a plurality of blocks mounted on said link plates and extending around the circumference of the belt, each of said blocks having a pin engagement groove defined by:

a circumferential contact surface for engaging a pin in the running direction of the belt;

an opening; and

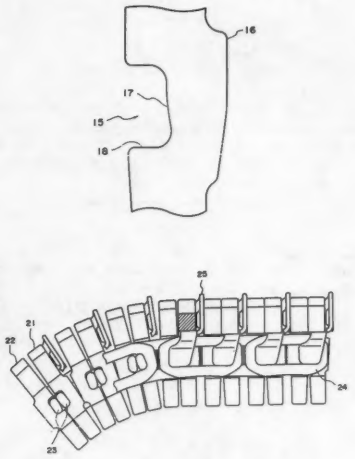
a pair of side walls each extending from said circumferential contact surface to said opening, one of said side walls providing a radial contact surface for a pin;

each of said pins having a transverse cross-section defined in part by:

a rocking surface for contact with its paired pin;

a first curved surface for radial contact with a sidewall of said pin engagement groove; and

a second curved surface for contacting said circumferential surface of a block and said link plates;



the dimensions of said radial contact surface of said pin engagement groove and the dimensions of said surfaces of each pin being selected to minimize, where the belt passes over a pulley, the difference between (1) Δr which is the total of the displacement of the points of contact between paired pins as a result of the pins of a pair rolling with respect to each other, the displacement of the pins per se and the relative displacement between said pairs of pins and said blocks due to their rotation relative to one another and (2) Δr_i which is the ideal Δr, from the viewpoint of variation in belt speed, vibration and noise.

4,878,888

PROCESS AND APPARATUS FOR SEVERING AND SUBSEQUENTLY STACKING FLAT ARTICLES MADE OF PLASTIC FILM AND PREFERABLY CONSISTING OF DOUBLE BAGS

Klaus Ullmann, Uplengen, Fed. Rep. of Germany, assignor to Windmoller & Holscher, Lengerich, Fed. Rep. of Germany

Filed Oct. 30, 1987, Ser. No. 114,919

Claims priority, application Fed. Rep. of Germany, Nov. 4, 1986, 3637491

Int. Cl.[4] B31B *1/64*

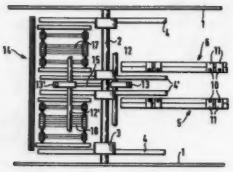
U.S. Cl. 493—204 **6 Claims**

1. A process of severing and subsequently stacking web sections which in their central portions are provided with locating holes, said process comprising:

delivering the web sections by a delivering means including a wicketer having pairs of inner and outer wicketer arms, which are arranged in a starlike array and rotate about a horizontal axis, and the web sections are deposited by said delivering means in a stacking station onto a stacking conveyor, which includes endless tensile elements, which are trained around reversing elements and are intermittently driven and provided with upstanding stacking pins,

the stacks formed by the web sections placed on the stacking pins are intermittently carried off by an intermittent advance of the tensile elements, and

the web sections having been perforated on or adjacent to the longitudinal center line of each section of the web,



severing said perforation line while the web sections are being transported by the delivery means and before the web sections are placed on the stacking pins and said severing is effected in that the web sections are subjected to a severing force.

4,878,889

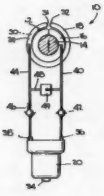
ARTIFICIAL SPHINCTER DEVICE

Mark Polyak, Minneapolis, Minn., assignor to American Medical Systems, Inc., Minnetonka, Minn.

Filed Jun. 24, 1988, Ser. No. 211,346

Int. Cl.[4] A61F *1/00*

U.S. Cl. 600—31 **11 Claims**



1. An implantable, unitary artificial sphincter for a body passage comprising:

a. an inflatable, flexible cuff adapted to be positioned around the body passage, which when inflated closes around and shuts the body passage, and when deflated opens the body passage;

b. an inflatable, flexible reservoir ring disposed around and fastened to the cuff, and predisposed upon inflation to straighten and open outward from the body passage;

c. a fluid passageway interconnecting the cuff and the ring; and

d. means for transferring fluid from the cuff to the reservoir ring.

4,878,890

PERIHEPATIC PROSTHESIS

Joseph Bilweis, Noisy le Roi, France, assignor to Ethicon, Inc., Somerville, N.J.

Filed Oct. 13, 1987, Ser. No. 108,385

Claims priority, application France, Oct. 15, 1986, 86 14312

Int. Cl.[4] A61F *2/02*

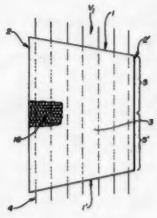
U.S. Cl. 600—37 **14 Claims**

1. A perihepatic prosthesis of a supple biodegradable surgical material for haemostasizing a hepatic lobe of a liver, comprising:

at least one wing constituted of a central part dimensioned in the shape of an isosceles trapezium for surrounding a hepataic lobe of a liver and including

a first peripheral fixing part comprising the longer base of said trapezium intended to be fixed on a falciform ligament of said liver, said longer base being suitable for substantially surrounding said liver proximate the jointure of said hepatic lobe with a second hepatic lobe of said liver;

a second peripheral fixing part comprising the shorter base of said trapezium opposing said longer base; and



first and second lateral edges comprising the non parallel sides of said trapezium and disposed between said longer and shorter bases and being suitable for enclosing said hepatic lobe within said prosthesis along a line extending from said remote end of said hepatic lobe to said longer base.

4,878,891

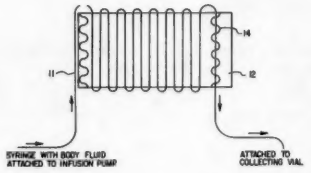
METHOD FOR ERADICATING INFECTIOUS BIOLOGICAL CONTAMINANTS IN BODY TISSUES

Millard M. Judy; James L. Matthews; Joseph T. Newman, and Franklin Sogandares-Bernal, all of Dallas, Tex., assignors to Baylor Research Foundation, Dallas, Tex.

Filed Jun. 25, 1987, Ser. No. 67,237

Int. Cl.[4] A61K *39/00*

U.S. Cl. 604—5 **63 Claims**



1. A method for eradicating infectious pathogenic biological contaminants from body fluids outside the body prior to introduction of the decontaminated body fluids into the body of a patient, said method comprising:

admixing an effective, non-toxic amount of a photoactive compound with the body fluid to produce a resulting body fluid, the photoactive compound having an affinity to be selectively bound to the contaminants;

passing the resulting fluid under flow conditions through a cell assembly having a predetermined flow path; and

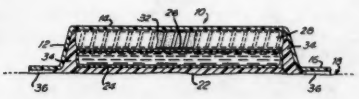
irradiating the resulting fluid in the cell assembly as same passes through the flow path with an effective level of radiation in the region of the visible spectrum, with a wavelength range upwards of about 400 nm to about 1000 nm, for an effective period of time such that the radiation penetrates the resulting fluid and exposes the photoactive-compound-bound contaminants to the radiation so as to eradicate such contaminants while maintaining the viability of said body fluids to produce viable decontaminated body fluids.

4,878,892

ELECTROLYTIC TRANSDERMAL DELIVERY OF POLYPEPTIDES

Dan Sibalis, Stony Brook, and Sanford Rosen, New York, both of N.Y., assignors to Drug Delivery Systems Inc., New York, N.Y.

Filed Feb. 10, 1987, Ser. No. 12,889
Int. Cl.[4] A61N *1/30*
U.S. Cl. 604—20 19 Claims



1. A transdermal patch for delivering at least one drug directly to the bloodstream of the patient comprising in combination:

(a) an active ingredient comprising at least one polypeptide having from three to 20 peptide units selected from the group consisting of vasopressin, lypressin, atriopeptin, oxytocin, desmopressin, a dynorphin, leuprolide, an angiotensin, and mixtures thereof contained in a drug reservoir, and

(b) electrolytic means for transdermal transport of the polypeptide characterized by a current density from about 0.5 microampere/cm^2 to about 1 milliampere/cm^2,

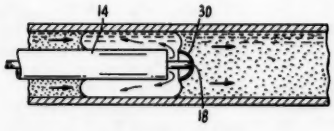
whereby the skin of the patient is neither irritated nor erythematized.

4,878,893

ANGIOSCOPE WITH FLUSH SOLUTION DEFLECTOR SHIELD

Albert K. Chin, Palo Alto, Calif., assignor to Thomas J. Fogarty, Palo Alto, Calif.

Filed Apr. 28, 1988, Ser. No. 187,482
Int. Cl.[4] A61B *1/12*
U.S. Cl. 604—21 3 Claims



1. An angioscope centering catheter for visualizing a vessel, the catheter comprising:

(a) an inner catheter having distal and proximal ends;

(b) an angioscope mounted within the inner catheter and having a distal viewing end for visualization at the distal end of the catheter;

(c) an outer sheath having distal and proximal ends, the inner catheter being disposed within the outer sheath for sliding movement with respect to the outer sheath, the outer sheath including a plurality of longitudinal slitted sections formed circumferentially near its distal end, the outer sheath and the inner catheter being connected at their distal ends such that when the inner catheter moves proximally with respect to the outer sheath, the slitted sections splay out radially and symmetrically about the longitudinal axis of the angioscope centering catheter to center the viewing end of the angioscope within the vessel; and

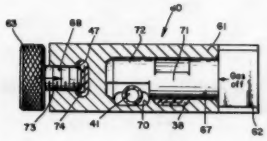
(d) a deflector shield mounted at and spaced apart from the distal end of the catheter to deflect the bolus of flushing solution provided by the catheter.

4,878,894

GAS/SALINE VALVE WITH SUCTION CONTROL

Leroy V. Sutter, Jr., and Harold A. Cameron, both of Irvine, Calif.

Filed Feb. 26, 1987, Ser. No. 19,434
Int. Cl.[4] A61B *17/36;* A61M *1/00*
U.S. Cl. 604—24 2 Claims



1. A gas/saline insufflation system for use with an arthroscopic attachment with a gas inlet and an arthroscope with a saline inlet, said gas/saline insufflation system comprising:

a. a gas insufflator which provides a flow of gas;

b. a first tubing in fluid communication with the gas insufflator for being coupled to a gas inlet of the arthroscopic attachment;

c. a saline source which provides a flow of saline;

d. a second tubing in fluid communication with said saline source for being coupled to a saline inlet of the arthroscopic attachment;

e. a housing with an open end which has a first bore and a second bore and which also has a first slotted chamber and a second slotted chamber both of which are contiguous to said first and second bores, respectively, within which said first and second tubings, respectively, are disposed; and

f. a gas/saline control knob having a solid cylinder which has a first semi-cylindrical notch and a second semi-cylindrical notch and which is rotatively coupled within said housing with said first and second semi-cylindrical notches being aligned with said first and second slotted chambers, respectively, whereby when an unnotched portion of said solid cylinder is contigous to either said first or second tubing, it compresses said tubing into either said first or second slotted chamber thereby closing off either said flow of gas or saline respectively, therein and when either said first or second semi-cylindrical notch becomes contiguous to either said first or second tubing, respectively, said tubing is no longer compressed thereby maintaining or turning on either said flow of gas or saline therethrough.

4,878,895

IN-VIVO STIMULATION, COLLECTION, AND MODIFICATION OF PERITONEAL MACROPHAGE

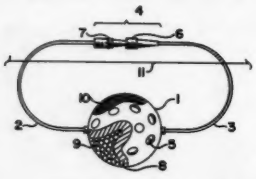
Phillip H. Klesius, and Debra A. Cross, both of Auburn, Ala., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Sep. 26, 1988, Ser. No. 248,744
Int. Cl.[4] A61M *1/00;* A61B *10/00*
U.S. Cl. 604—49 24 Claims

1. An apparatus for collection of macrophage from the peritoneal cavity of a vertebrate including,

container means consisting essentially of membrane means, completely enclosing therein an interior volume, for excluding tissue growth into said interior volume and for

permitting permeation of macrophage through said membrane means into said interior volume, and



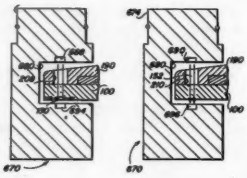
cell supporting means filling at least a portion of said interior volume.

4,878,896

CASSETTE OPTICAL IDENTIFICATION APPARATUS FOR A MEDICATION INFUSION SYSTEM

Michi E. Garrison, Granada Hills, and John P. Pelmulder, Chatsworth, both of Calif., assignors to Pacesetter Infusion, Ltd., Sylmar, Calif.

Filed Dec. 1, 1987, Ser. No. 128,009
Int. Cl.[4] A61M *5/18*
U.S. Cl. 604—65 **16 Claims**



1. A system for providing information identifying which of a series of disposable cassettes is installed on a main unit in a medication infusion system, comprising:

a projection located on said disposable cassette;

an optical receiving module mounted on said main unit, said optical receiving unit defining an opening therein for receiving aid projection on said disposable cassette when said disposable cassette is installed onto said main unit;

first optical signal source means for providing a first light beam, said first optical signal source means being located in said optical receiving module on one side of said opening;

second optical signal source means for providing a second light beam, said second optical signal source means also being located in said optical receiving module on said one side of said opening;

first optical signal sensor means for receiving said first light beam, said first optical signal means being located in said optical receiving module on the other side of said opening opposite said first optical signal source means;

second optical signal sensor means for receiving said second light beam, said second optical signal sensor means also being located in said optical receiving module on the other side of said opening opposite said second optical signal source means;

first identification means for controlling the passage of said first light beam through said projection on said disposable cassette from said first optical signal source means to said first optical signal sensor means, said first identification means alternatively being either conductive of light to allow the passage of light therethrough, or nonconductive of light to prevent the passage of light therethrough, said first identification means being located on said projection on said disposable cassette; and

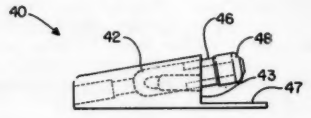
second identification means for controlling the passage of said second light beam through said projection on said disposable cassette from said second optical signal source means to said second optical signal sensor means, said second identification means alternatively being either conductive of light to allow the passage of light therethrough, or nonconductive of light to prevent the passage of light therethrough, said second identification means being located on said projection on said disposable cassette.

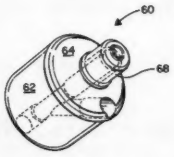
4,878,897

INJECTION SITE DEVICE HAVING A SAFETY SHIELD

Gerald H. Katzin, Raleigh, N.C., assignor to Ideation Enterprises, Inc., Raleigh, N.C.

Continuation-in-part of Ser. No. 863,577, May 15, 1986, abandoned. This application Nov. 26, 1986, Ser. No. 935,286
Int. Cl.[4] A61M *5/14*
U.S. Cl. 604—86 **7 Claims**





1. An injection site device suitable for facilitating the infusion of a drug and the like into a patient through the primary flow path of an IV administration system wherein the device comprises a bifurcated juncture of the generally "Y" shape type having in fluid communication, an injection port at a first end of a tubular body member, an inlet port adjacent the first end and extending outwardly from the body member, and an outlet port at the other end of a body member, the improvement which comprises grasping means extending generally outwardly from said tubular body member so that when the fingers of the user are applied to grasp the body member, they will be distally spaced from the injection port and out of the path of the needle should the user miss the injection port with the needle, said grasping means comprising a cylindrical housing surrounding the bifurcated juncture and extending radially outwardly from said tubular body member a distance sufficient to fully remove the fingers of a user from the area immediately surrounding the injection port.

2. An injection site device suitable for facilitating the infusion of a drug and the like into a patient through the primary flow path of an IV administration system wherein the device comprises a bifurcated juncture of the generally "Y" shape type having in fluid communication, an injection port at a first end of a tubular body member, an inlet port adjacent the first end and extending outwardly from the body member, and an outlet port at the other end of a body member, the improvement which comprises: a finger protecting shield means extending generally radially outwardly from the tubular body member and positioned between the injection port and the outlet port of the device for protecting a user's fingers from needle puncture when the injection site device is held in one hand beneath the shield means and the other hand is used to

insert a needle into the injection port, said shield means extending radially outwardly from said tubular body member a distance sufficient to fully shield the fingers of a user from said needle, said shield means further including a non-foldable skirt connected to said body member at an angle to said shield means and being adapted to lie flat against the skin of a patient for increased comfort and to further protect the patient from accidental puncture by the needle.

4,878,898

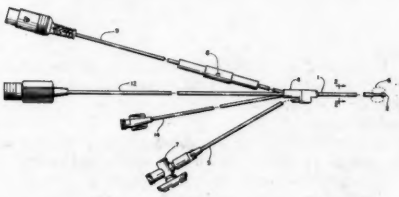
THERMODILUTION AND PRESSURE TRANSDUCER BALLOON CATHETER

Joseph C. Griffin, Atco, and James L. Skaggs, Indian Mills, both of N.J., assignors to Nova Medical Specialties, Indian Mills, N.J.

Continuation-in-part of Ser. No. 85,551, Aug. 17, 1987, abandoned. This application Sep. 16, 1988, Ser. No. 245,623

Int. Cl.[4] A61M *29/00*

U.S. Cl. 604—101 **7 Claims**



1. A multiple lumen balloon catheter for pulmonary artery catheterization procedures comprising:

a multiple lumen catheter body having a distal end portion and proximal end portions;

inflatable balloon means surrounding said distal end portion and including hollow elastic cylindrical sleeve means having inside and outside surfaces, said sleeve means adhesively affixed proximal to said distal end to said catheter body by the inside surface of said sleeve means and adhesively affixed adjacent to the distal end of said catheter body by the outside surface of said sleeve means which has been turned inwardly of the sleeve so as to be inside at least a portion of the inside surface of said sleeve means, and

transducer means containing housing means having a closed distal end and an open proximal end and capable of being received in fluid tight relationship at the distal end of one of said lumens and adhesively adhered therein, said housing means containing arranged therein a silicon strain gauge bridge within but not fixedly connected to said housing means having wire means electrically connected thereto said wire means communicating through said lumen to the proximal end portion of said catheter body; a piezoelectric Silicon strain gauge means having a front face and a rear face, said rear face being distally contiguous to said strain gauge bridge but not affixed thereto and in electrical contact therewith so that changes in resistance in said piezoelectric strain gauge means can be electrically sensed through the wire means electrically connected to said strain gauge bridge and said wire means, such changes in resistance being proportion to the pressure exerted onto the front face of said transducer means;

force transmitting means closing the distal end of said housing and contiguous to the distal face of said strain gauge means said force transmitting means comprising metal diaphragm means normally in physical contact with said strain gauge means and a titanium diaphragm means located distally of said metal diaphragm means and contiguous thereto, covering said open distal end of said housing means and in fluid tight relationship therewith to form the distal face of said transducer housing means, whereby fluid pressure applied to the titanium diaphragm means transmits a force to said metal diaphragm and onto said strain gauge means to produce a change in resistance that is proportional to said applied force and detectable through the wire means electrically connected to said silicon strain gauge bridge; and said transducer means being located axially of the circumference of said balloon means when said balloon means is inflated.

4,878,899

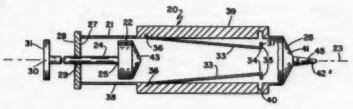
DISPOSABLE SYRINGE FOR ONE-TIME USE

Frederick L. Plouff, 21A Sweetser St., Wakefield, Mass. 01880

Filed Feb. 26, 1988, Ser. No. 160,712

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—110 **18 Claims**



1. A disposable syringe for one-time use comprising:

a cylindrical barrel having a side wall, an axis, and two ends one of which is a distal end for the administration of a fluid;

a cylindrical plunger mounted snugly and fluid tight for axial movement within the barrel;

an actuating rod connected to the plunger and of radial extent less than that of the plunger, the barrel having at the other, proximal end means for guiding the actuating rod axially;

a pin of spring material within the barrel and having two ends, the proximal end being securely fixed and sealed imbedded in the side wall at an axial position and the other, distal end being free and located axially within the barrel nearer the other, distal end of the barrel than the axial position of imbedment of the pin and having a position radially within the side wall;

the plunger being movable by the actuating rod from a position nearer the one, distal barrel end to a position nearer the other, proximal barrel end and beyond the proximal end of the pin, the barrel on such movement camming the pin free end aside from its normal position toward the wall of the barrel until with continued plunger movement the free end is freed and returns by elasticity of the spring material to its normal position radially within the wall;

whereby on such movement the plunger is captured by the pin at its free end to prevent return movement of the plunger toward the proximal end of the barrel and thereby to prevent re-use of the syringe.

4,878,900

SURGICAL PROBE AND SUCTION DEVICE

Thoralf M. Sundt, Dept. of Neurosurgery, Mayo Clinic, Rochester, Minn. 55905

Filed Jul. 27, 1988, Ser. No. 224,943

Int. Cl.[4] A61M *1/00*

U.S. Cl. 604—119 **14 Claims**

1. A surgical probe and suction device comprising:

(A) an elongated tubular handle having a central longitudinal passage and means at one end for connection to a vacuum source,

(B) a suction regulating orifice in said handle communicating with said central passage,

(C) a separable elongated tubular probe and suction member connected to the opposite end of said handle and having an open passage therethrough,

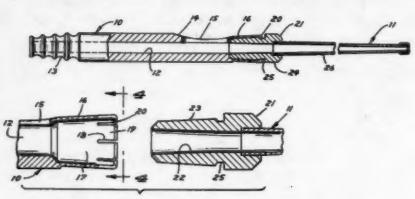
(D) a positive snap-on rotatable connection between said

handle and probe and suction member, said connection comprising:

(1) a tapered male connection member extending from the probe or the handle having a central passage therethrough,

(2) an annular groove around said male connection member spaced from the end thereof,

(3) a mating female connection member adapted to receive and engage said male connection member extending from the other of said probe or handle and comprising:



(a) an annular ring having a plurality of parallel resilient finger members closely and uniformly spaced apart about a central passage, and

(b) an inwardly directed lip at the ends of each of said finger members adapted to engage the annular groove around said male connection member, and

(E) a blunted distal end on said probe and suction member surrounding the open passage therein.

4,878,901

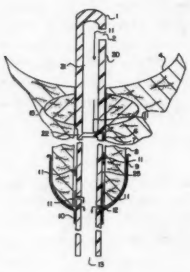
CONDOM CATHETER, A URETHRAL CATHETER FOR THE PREVENTION OF ASCENDING INFECTIONS

Hans-Ernst Sachse, 8500 Nuernberg 90, Lerchenstr. 55, Fed. Rep. of Germany

Filed Dec. 7, 1987, Ser. No. 129,448

Int. Cl.[4] A61M *5/32*

U.S. Cl. 604—174 **5 Claims**



1. Indwelling urethral catheter arrangement for the prevention of ascending bacterial infection, comprising

a catheter shaft having an upper section with a diameter sufficiently large to substantially prevent passage of urine externally thereof, and a lower section at least a part of which is of reduced diameter, said catheter shaft having lateral outlet opening means near the upper end of said part, lateral inlet opening means at a lower point of said part and lumen stopper means intermediate said outlet and inlet opening means so that the urinary stream is deflected for relatively free flow over the distance defined by said opening means to the generally annular space between the urethral wall and the outside of said catheter shaft, and a condom-like sheath in the region of said lower end, said sheath at its bottom having an aperture surrounding the lower section of said catheter shaft in sealing relationship, and at its top being fittable over the penis,

so that, on the one hand, the bacteria are flushed downwardly by the urinary stream and , on the other hand, the entire urinary stream is conducted in a leakproof manner to the outside of said catheter arrangement.

4,878,902

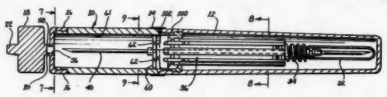
NEEDLE GUARD FOR BODY SUBSTANCE ISOLATION

Alan A. Wanderer, 1075 E. Radcliffe, Englewood, Colo. 80110, and William E. Sagstetter, 2217 E. Grove, Denver, Colo. 80210

Filed Feb. 25, 1988, Ser. No. 160,150

Int. Cl.[4] A61M *5/32*

U.S. Cl. 604—192 **21 Claims**



1. A guard for enclosing a needle extending from a hub before and after use to prevent inadvertent needle stick and to provide body substance isolation, said guard comprising in combination:

(a) means for locating said guard relative to the hub in a first position to enclose the needle within said guard;

(b) means for posteriorly relocating said guard to and for urging retention of said guard in a second position relative to the hub to exteriorize the needle from within said guard;

(c) means for anteriorly repositioning said guard for locking said guard in a third position relative to the hub to reenclose the needle within said guard; and

(d) means for isolating within said guard any body substances attendant the needle and within upon repositioning of said guard into the third position, said isolating means including means for sealing the posterior end of said guard about the hub, said sealing means comprising a piston associated with the hub and taper means disposed at the junction of said piston and said guard upon location of said guard in the third position for developing a seal at the junction between said piston and said guard.

4,878,903

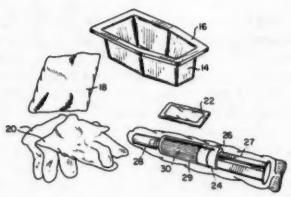
PREFILLED CATHETER TIP SYRINGE KIT

Louis H. Mueller, 165 Sheffield Cir., Palm Harbor, Fla. 34683

Filed Apr. 15, 1988, Ser. No. 182,259

Int. Cl.[4] B65D *83/10*

U.S. Cl. 604—199 **3 Claims**



1. A device for use as a single use, disposable, sterile irrigation kit for catheter irrigation, comprising:

a prefilled sterile piston syringe containing from about 45 to about 75 cc of a fluid selected from sterile water, saline solution and dilute aqueous acetic acid solutions, said

syringe including a catheter tip sized to operably connect to a conventional catheter tube, a cap on said tip removably mounted to selectively prevent escape of said fluid from said syringe and prevent movement of said piston while said cap is on said tip, and kit further including a disposable pouch for enclosing said filled syringe, said pouch and said filled syringe being sterilized after enclosure of said syringe in said pouch, said device further including a container having a tear-off top labeled with the specific solution in said syringe and enclosing said pouch containing said filled syringe and further including sterilized gloves and an applicator pad.

4,878,904

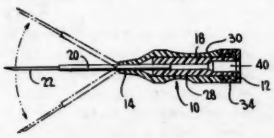
INTRAVENOUS NEEDLE AND HOLDER ASSEMBLY

James J. Callaway, 300 25th Ave. North, Nashville, Tenn. 37203

Filed Jun. 16, 1987, Ser. No. 62,584

Int. Cl.[4] N61M *5/00*

U.S. Cl. 604—273 **12 Claims**



1. an intravenous needle and holder assembly having an outer case, an intravenous needle for receipt in the outer case with at least a part of the needle projecting from a forward end of the case, and adjustment means attached to a back end of the needle for selectively establishing an insertion orientation of the assembly having a substantially rigified junction between the needle and the case effectively preventing lateral movement of the case, relative to the needle, and an administration orientation of the assembly having a flexible junction between the needle and the case allowing lateral movement of the case relative to the needle.

4,878,905

GASTROINTESTINAL MODULE: A NONSURGICAL IMPLANT

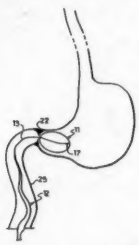
Karl G. Blass, University of Regina, Regina, Saskatchewan, Canada (S4S 0A2)

Continuation of Ser. No. 11,476, Feb. 5, 1987, abandoned. This application Aug. 10, 1988, Ser. No. 230,686

Claims priority, application United Kingdom, Feb. 7, 1986, 8603099

Int. Cl.[4] A61K *9/22*; A61M *31/00*

U.S. Cl. 604—891.1 **12 Claims**



1. A gastrointestinal module comprising in combination a collapsible gastric anchor component including a flexible cavity-wall gastric engaging member and a plurality of flexible, resilient ribs extending upwardly therefrom converging to a common apex, an intestinal payload component containing releasable medicaments for altering the biochemical process within the bowel, tether means secured to the anchor component only adjacent said apex and extending downwardly therefrom through and unconnected to said gastric-cavity wall engaging member to the payload component connected to and supporting said payload component from said anchor component, and means maintaining said anchor component in a collapsed condition until implanted.

4,878,906

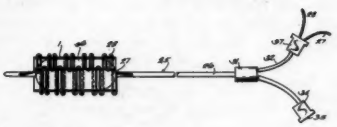
ENDOPROSTHESIS FOR REPAIRING A DAMAGED VESSEL

Peer Lindemann, West Bend, and Victor M. Haughton, Dousman, both of Wis., assignors to Servetus Partnership, Milwaukee, Wis.

Division of Ser. No. 843,992, Mar. 25, 1986, abandoned. This application Jun. 6, 1988, Ser. No. 202,562

Int. Cl.[4] A61F *2/06*; A61B *17/04*

U.S. Cl. 623—1 **4 Claims**



1. An apparatus for repairing a damaged area of a body vessel, comprising:

a resilient sleeve adapted for placement within the vessel and having a length sufficient to bridge the damaged area of said vessel, said sleeve being radially collapsible to a collapsed condition and capable of thereafter expanding to its original uncollapsed condition, said sleeve having an outside diameter sufficient to form an interference fit between the outer wall of the sleeve and the inner wall of the vessel throughout substantially the entire length of the sleeve;

percutaneous insertion means for inserting the sleeve into the body vessel, said insertion means including a thin walled sheath for retaining said sleeve in its collapsed condition against radially outward pressure exerted thereby during placement of said sleeve within said vessel, said insertion means being removable after placement of said sleeve within said vessel;

said thin walled sheath being provided at the end of an elongated flexible catheter adapted for percutaneous placement within said vessel for transporting said sleeve to the location of the damaged area of said vessel, said catheter and sheath being removable from said vessel while said sleeve is retained at the location of the damaged area of said vessel for allowing said sleeve to return to its original unexpanded condition upon withdrawal of said catheter and sheath; and

collapsing means for collapsing said sleeve, comprising a thread adapted to be looped about the circumference of said sleeve throughout substantially the entire length of said sleeve, and to be tightened about said sleeve so as to collapse said sleeve onto said catheter for subsequent insertion of said sleeve into said thin walled sheath.

4,878,907

SYNTHETIC VASCULAR PROSTHESIS

Masao Okada, 4-48, Soden-Higashi-cho, Gifu-shi, Gifu; Kazuhiko Sakai, 1-3, Ozaki-Nishi-machi, Kakamigahara-shi, Gifu; Haruo Kimura, 28, Shimohonmachi, Kasamatsu-cho, Hashima-gun, Gifu, and Yoshito Ikada, 2-182, Hirookadani, Gokanosho, Uji-shi, Kyoto, all of Japan

Filed Nov. 6, 1987, Ser. No. 117,696
Claims priority, application Japan, Nov. 10, 1986, 61-265578
Int. Cl.[4] A61F *2/06*
U.S. Cl. 623—1 7 Claims

1. A synthetic vascular prosthesis having a compliance close to that of a natural blood vessel, consisting essentially of:

a hollow tubular base member formed of an elastomer material and having formed throughout a wall thereof a multitude of continuous pores; and

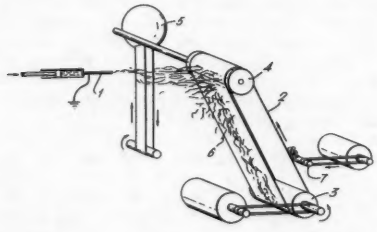
a hydrogel layer formed on the inner surface of said base member, the outer portion of said hydrogel layer being partially embedded in the inner portion of said base member at said pores to thereby achieve anchoring adhesion between said hydrogel layer and said base member, and said hydrogel layer having a smooth inner surface.

4,878,908

FIBRILLAR PRODUCT

Graham E. Martin; Ian D. Cockshott, both of Runcorn, and Francis J. T. Fildes, Macclesfield, all of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 14,114, Feb. 4, 1987, abandoned, which is a continuation of Ser. No. 824,944, Feb. 3, 1986, abandoned, which is a continuation of Ser. No. 728,458, May 1, 1985, abandoned, which is a continuation of Ser. No. 547,451, Oct. 31, 1983, abandoned. This application Jun. 1, 1988, Ser. No. 203,546
Claims priority, application United Kingdom, Aug. 5, 1974, 7434338
Int. Cl.[4] A61F *2/06*
U.S. Cl. 623—1 9 Claims



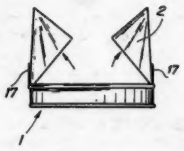
1. A prosthetic device comprising a tube of vascular diameter said tube comprising an electrostatically spun mat of fibres of diameter 0.1 to 25 microns of a biologically acceptable polymeric material which is selected from the group consisting of polyurethane, polyamide or polyacrylonitrile, and fibres adjacent the bore of the tube having a disposition substantially parallel to the inner surface of the tube, said mat having a thickness of 0.5 mm to 5 mm.

4,878,909

HIGH EFFICIENCY CARDIAC VALVE

Roberto Parravacini, Viale Reiter, 51, 41100 Modena, Italy

Filed Sep. 27, 1988, Ser. No. 249,947
Claims priority, application Italy, Oct. 6, 1987, 22167 A/87
Int. Cl.[4] A61F *2/24*
U.S. Cl. 623—2 3 Claims



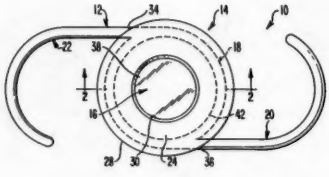
1. A high efficiency artificial cardiac valve, comprising an annular body and valve members, said annular body consisting of an outer ring member and an inner ring member coupled to one another, said inner ring member, at one axial end thereof, defining a projecting rim therein there are formed pivot seat means of said valve members and a bearing surface, said outer ring member defining a flanged rim and a closure surface, said outer ring member and inner ring member being arranged with a concentrical and coaxial relationship with respect to one another, said pivot seat means being formed in a portion of said projecting rim of said inner ring member, said inner ring member being split into two pieces and said seat being closed.

4,878,910

INTRAOCULAR LENS ASSEMBLY

Jeffrey E. Koziol, 1211 S. Arlington Heights Rd., Arlington Heights, Ill. 60005, and Gholam A. Peyman, 123 Walnut St., New Orleans, La. 70118

Filed Jun. 13, 1988, Ser. No. 205,640
Int. Cl.[4] A61F *2/16*
U.S. Cl. 623—6 26 Claims



24. An intraocular lens assembly, the combination comprising:

an optical lens;

a resilient housing having an anterior wall with an aperture therein and a posterior wall, said optical lens being received in said housing and located between said anterior and posterior walls; and

a pair of support arms extending from said resilient housing, said pair of support arms extending into said housing.

4,878,911

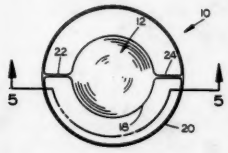
FLEXIBLE ONE-PIECE POSTERIOR CHAMBER LENS

Aziz Y. Anis, 7531 N. Hampton, Lincoln, Nebr. 68506

Continuation of Ser. No. 67,163, Jun. 29, 1987, abandoned, which is a continuation-in-part of Ser. No. 44,753, May 1, 1987, Pat. No. 4,804,361, and a continuation-in-part of Ser. No. 201,388, May 17, 1988, which is a continuation of Ser. No. 624,232, Jun. 25, 1984, abandoned. This application Sep. 19, 1988, Ser. No. 248,236

Int. Cl.[4] A61F 2/16

U.S. Cl. 623—6 6 Claims



1. A one-piece intraocular lens implant, comprising:

a flexible, substantially ring-shaped position fixation member having a diameter of between 8.0 and 13.0 millimeters wherein the fixation member, after implantation of the lens implant, engages the capsular bag for 360 degrees;

a lens body having a diameter of between 4.0 and 8.0 millimeters, but less than said position fixation member and being positioned within said position fixation member; and

connection means connecting said lens body with said position fixation member, including no more than two members which extend oppositely from said lens body, said connection means being adapted to permit compression of opposing sides of said fixation member intermediate said post members inwardly to the lens body.

4,878,912

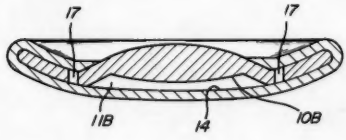
FOLDABLE INTRAOCULAR DISC LENS

Lawrence D. Castleman, 1201 Water Cliff Dr., Bloomfield Hills, Mich. 48013

Filed Nov. 9, 1988, Ser. No. 269,189

Int. Cl.[4] A61F 2/16

U.S. Cl. 623—6 20 Claims



1. A flexible intraocular polymeric disc lens that is foldable for intercapsular insertion into a surgical incision of an aphakic capsular sac and is unfoldable within the sac for vision-enabling implantation therein in normal lens-oriented relation parallel to the iris plane, comprising:

a substantially circular disc body having an anterior face and a posterior face, the disc body including a central optic portion and a unitary forwardly dished rim that is circumferentially coextensive with the inner lateral dimensions of said sac so as to afford autocentration of the lens when implanted, the posterior surface of said rim of the unfolded disk body being extended forwardly at a rim angle with respect to the plane of the central optic portion and being axially spaced apart from the posterior surface of said optic portion such that when the disc lens is folded, implanted centrally in the sac and unfolded the rim posterior surface is in coextensive annular contact with the similar forwardly angulated inner surface of the posterior capsule of the sac and the posterior optic surface is axially spaced away from the posterior capsule thereby providing a behind-the-lens cavity within the rim as a site for postoperative corrective laser surgery behind the lens.

4,878,913

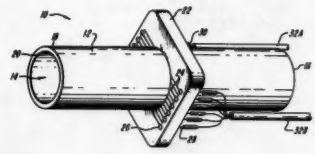
DEVICES FOR NEURAL SIGNAL TRANSMISSION

Patrick Aebischer; Robert F. Valentini, and Pierre M. Galletti, all of Providence, R.I., assignors to Pfizer Hospital Products Group, Inc., New York, N.Y.

Filed Sep. 4, 1987, Ser. No. 93,371

Int. Cl.[4] A61F 2/04, 2/72

U.S. Cl. 623—12 16 Claims



1. A device for transmitting neural signals from a proximal stump of a transected nerve to a prosthetic apparatus, said transmission device comprising:

a microelectrode capable of sensing electrical signals from a nerve and transmitting said signals to said prosthetic apparatus; and

a guidance channel disposed about said microelectrode, comprising a tubular, semipermeable membrane and having a capped distal end and a proximal end which defines an opening adapted to receive a proximal stump of a transected nerve, whereby said channel promotes the growth of said stump, such that an electrical connection between said transected nerve and said microelectrode can be obtained.

4,878,914

CERAMIC PROSTHESIS FOR LIVING BODY & METHOD OF MAKING THE SAME

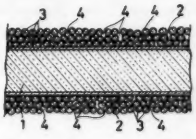
Takeru Miwa, and Iwao Noda, both of Shiga, Japan, assignors to Kyocera Corporation, Kyoto, Japan

Continuation of Ser. No. 758,101, Jul. 23, 1985, abandoned. This application Jul. 1, 1988, Ser. No. 214,874

Claims priority, application Japan, Jul. 23, 1984, 59-153582

Int. Cl.[4] A61F 2/28, 2/30

U.S. Cl. 623—16 13 Claims



1. A prosthesis, comprising:

a ceramic substrate;

a ceramic layer formed of ceramic particles said layer comprising a mixture of a first group of ceramic particles and a second group of ceramic particles, the first group of ceramic particles having a mean diameter within the range of 250 to 350μ, the second group of ceramic particles having a mean diameter within the range 1,000 to 1,500μ, the ceramic layer also having interconnected gaps formed

between substantially all of the ceramic particles, the gaps having a mean size less than the mean diameter of the particles; and

a layer of sintered ceramic bonding the layer of ceramic particles to the ceramic substrate, the interconnected gaps of the ceramic layer forming a network into which bone tissue may grow.

4,878,915

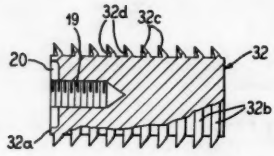
SURGICAL PROSTHETIC IMPLANT FACILITATING VERTEBRAL INTERBODY FUSION

John W. Brantigan, 2108 Bramblewood La., Fremont, Nebr. 68025

Continuation of Ser. No. 95,461, Sep. 11, 1987, abandoned, which is a continuation-in-part of Ser. No. 5,785, Jan. 22, 1987, Pat. No. 4,743,256, which is a continuation of Ser. No. 784,112, Oct. 4, 1985, abandoned. This application Jan. 4, 1989, Ser. No. 293,578

Int. Cl.[4] A61F *2/44, 5/04*

U.S. Cl. 623—17 9 Claims



1. A prosthetic plug implant for forming a rigid transverse strut between opposed prepared posterior to anterior transversely extending laterally spaced channels in faces of adjacent vertebrae of a vertebral column to maintain the disc space therebetween which comprises at least a pair of laterally spaced side-by-side rigid inert plugs sized and shaped to fit the prepared channels in the faces of the vertebrae and having roughened surfaces on the periphery thereof, said roughened surfaces having irregularities to interlock with the bone of the prepared channels and recesses for receiving bone to facilitate bone ingrowth, and said plugs each having an end face with tool receiving and mounting means extending internally of the plug to secure each plug endwise on the end of a tool for inserting the plug endwise transversely of the axis of the vertebral column in the prepared channels and to accommodate removal of the tool from the plug after insertion.

4,878,916

PROSTHETIC CUPULE

Jean-Luc Rhenter, 11, rue de l'Annonciade, 69001 Lyon, and Jean Collomb, L'Olagnier, 26800 Partes-Les-Valence, both of France, assignors to Jean-Luc Rhenter; Jean Collomb and Jacques Bejui, all of, France

Continuation of Ser. No. 124,946, Nov. 3, 1987, abandoned. This application Jan. 19, 1989, Ser. No. 300,173

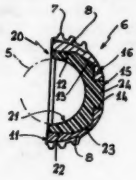
Int. Cl.[4] A61F *2/34*

U.S. Cl. 623—18 9 Claims

1. A prosthesis cupule, comprising:

a metallic support cupule for fixing to a bone, and a friction cupule of plastic material having an internal surface in the form of a concave approximate semi-sphere to fit over a spherical head of a pin, an axis of said semi-spherical surface being normal to the central plane defining the extent of the approximately semi-spherical surface, and an external surface comprising at least one surface parallel to said axis, the coefficient of expansion of the plastic material constituting the friction cupule is at 20° C. sufficiently greater than that of the metal constituting the support cupule, so that the expanded friction cupule is compressed and tightly held within the support cupule at body temperature, that is at about 37° C.,

said metallic support cupule having an internal cavity for receiving the external face of the friction cupule;



and wherein at body temperature, said friction cupule expands and is compressed against said internal cavity and tightly held therein, thereby providing the sole engagement between said friction and metallic support cupules.

4,878,917

MODULAR ASSEMBLY FOR A SHAFT PROSTHESIS

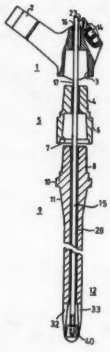
Curt Kranz, and Emmanuel Anapliotis, both of Berlin, Fed. Rep. of Germany, assignors to Mecron medizinische Produkte GmbH, Berlin, Fed. Rep. of Germany

Filed Apr. 23, 1987, Ser. No. 41,378

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1986, 8611697[U]

Int. Cl.[4] A61F *2/30*

U.S. Cl. 623—18 6 Claims



1. A modular assembly for a shaft prosthesis which comprises:

(a) a head part,

(b) an end part, one of said head part and end part having a conical protrusion and the other of said head part and end part having a conical bore, and

(c) at least one intermediate part engagable with both said protrusion and said bore of said head part and end part and disposed between said parts,

(d) said head part and said at least one intermediate part each having an aligned through bore, said end part having a bore with releasable engaging means for transmitting a force in the axial direction along said bore, the bores all being aligned axially relative to one another when said parts have been joined together, and

(e) a tension rod extending through said aligned bore of each said part having an engaging element adapted to be engagable with said releasable engaging means for releasable engagement therewith, said tension rod projecting beyond

said head part when said head and end parts have been joined together, said tension rod having a region of reduced cross section designed to break upon excessive tightening of said tension rod, the tensile strength of said region corresponding to a force that is sufficient to seat the connecting cones of said head, end and at least one intermediate part in such a manner that in the implanted state they are secured against loosening.

4,878,918

MECHANICALLY FIXED ACETABULAR UNIT FOR PROSTHESES AND IMPLANTATION DEVICE FOR FIXING IT INTO THE COTYLOID CAVITY

Gábor Tari, Harsfa u. 16, 6640 Csongrád; Zoltán Badó, Ifjuság sétány 12, 6600 Szentes, and Imre Juhász, Felszabadulás u. 61/a, 6800 Hódmezovásárhely, all of Hungary

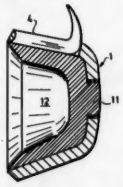
PCT No. PCT/HU85/00062, § 371 Date Jan. 28, 1987, § 102(e) Date Jan. 28, 1987, PCT Pub. No. WO86/05679, PCT Pub. Date Oct. 9, 1986

PCT Filed Nov. 5, 1985, Ser. No. 2,685

Claims priority, application Hungary, Mar. 29, 1985, 1186/85

Int. Cl.[4] A61F *2/32*

U.S. Cl. 623—22 **12 Claims**



1. A mechanically fixable acetabular unit for prostheses comprising:

(a) an acetabular basket made of biocompatible material having an open face, a curved base and walls defining an interior space;

(b) cutouts defined by said walls of said acetabular basket;

(c) L-shaped anchors, having a longer and a shorter shank, positioned within said cutouts in such a manner that said shorter shank is at the portion of the cutout nearest said curved base and said shorter shank is formed as a sharp pointed claw, whereby said L-shaped anchors pivot, said pointed claw on each anchor thus engaging a bone;

(d) a threaded bore defined by said curved base of said acetabular basket; and

(e) an acetabular basket insert comprising:

(i) insert side walls having the same shape as the walls of said acetabular basket defining said interior space;

(ii) an insert base having the same shape of the curved base of said acetabular basket defining said interior space;

(iii) a threaded pin, dimensioned, configured and proportioned to matingly engage said threaded bore defined by said curved base, said threaded pin located on said insert base; and

(iv) a cavity having a hemispherical surface, said inset maintaining said anchors in a pivoted, bone engaging position when said insert is placed in said acetabular basket.

4,878,919

ARTIFICIAL HIP ENDO-LIMB

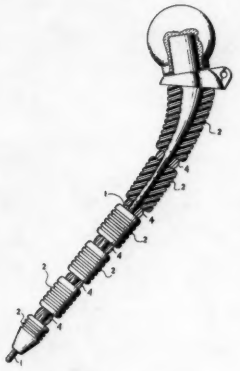
Rudolf Pavlansk, and Miroslay Petrt l, both of Prague, Czechoslovakia, assignors to Ceske Vysoke Uceni Technicke, Pragne, Czechoslovakia

Continuation-in-part of Ser. No. 676,573, Nov. 30, 1984, abandoned. This application Dec. 9, 1986, Ser. No. 939,643

Claims priority, application Czechoslovakia, Nov. 30, 1983, 8930-83

Int. Cl.[4] A61F *2/36*

U.S. Cl. 623—23 **9 Claims**



1. An improved artificial hip endo-limb having a spherical joint supported by a metal shaft for insertion in a bone marrow channel, wherein said shaft is surrounded by substantially cylindrical segments of porous ceramic and said segments are transversely separated by substantially cylindrical elastomeric spacing elements which surround the shaft, and

wherein said shaft is sufficiently elastic so as to accomodate itself to said bone marrow channel.

4,878,920

PROCESS FOR THE CONTINUOUS DYEING OF INDUSTRIAL NYLON

Ernest J. Russell, Greensboro, and Tanya E. FitzGerald, Fuquay-Varina, both of N.C., assignors to Burlington Industries, Inc.

Filed Apr. 28, 1987, Ser. No. 43,360
Int. Cl.[4] D06P *00/00*
U.S. Cl. 8—476 10 Claims

1. A continuous process for uniformly dyeing high tenacity nylon 6,6 fabrics comprising the sequential steps of:

(a) continuously applying to a high tenacity, highly crystalline nylon 6,6 fabric whose fibers have a breaking tenacity in the range of about 6.0 to about 9.8 g/denier, an aqueous dyebath containing a tinctorial amount of at least one dye the dyebath applied at a temperature of from about 65° C. to about 95° C.;

(b) subjecting the dyed fabric to superheated steam at atmospheric pressure and at a temperatures greater than 100° C. up to 160° C. for a period of time up to 3 minutes sufficient to fix the dye to the fabric; and

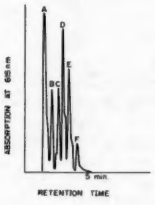
(c) washing the dyed fabric to remove any unfixed dye and drying the dyed fabric.

4,878,921

NATURAL BLUE DYE COMPOSITION AND COLORANT USING THE SAME: PREPARED BY REACTING TAURINE AND GENIPIN

Kunimasa Koga; Shigeaki Fujikawa, and Yuko Fukui, all of Osaka, Japan, assignors to Suntory Limited, Osaka, Japan

Filed Jun. 19, 1987, Ser. No. 65,033
Claims priority, application Japan, Jun. 21, 1986, 61-145651
Int. Cl.[4] A23L *1/27*; C09B *61/00*
U.S. Cl. 8—646 5 Claims



1. A blue dye composition that is prepared by reacting genipin with taurine at a temperature between 40 and 100° C. and at a pH between 4 and 9 and which, when analyzed by high-pressure chromatography, produces a chromatogram containing the following six principal components, A to F, which respectively have approximate retention times of 1.6 min., 2.3 min., 2.7 min., 2.9 min., 3.6 min., and 4.4 min., with components A, B and C each having an absorption maximum (λ_{max}) of about 592 nm, component D with λ_{max} of about 602 nm, component E with λ_{max} of about 614 nm, and component F with λ_{max} of about 627 nm, as measured in 40% ethanol.

4,878,922

FIREPLACE STARTER COMPOSITION

John A. Kaye, Parkersburg, W. Va., assignor to A and A Realty Company, Parkersburg, Va.

Continuation-in-part of Ser. No. 30,254, Mar. 24, 1987, abandoned, which is a continuation-in-part of Ser. No. 920,410, Oct. 20, 1986, abandoned. This application Jul. 26, 1988, Ser. No. 224,446
Int. Cl.[4] C10L *5/00*
U.S. Cl. 44—502 9 Claims

1. A granular fire initiation composition comprising wood by-products, solid hydrocarbons, liquid fuel, and scent producing materials and particulate ammonium nitrate impregnated with a hydrocarbon.

7. The composition as defined in claim 1 wherein the composition is wrapped in cellophane and packaged in an aluminum tray.

8. The composition as defined in claim 1 wherein the proportions are about:

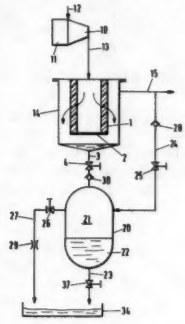
50% to 70% wood by-products,
10% to 30% solid hydrocarbons,
2% to 8% liquid fuel,
5% to 20% scent producing material, and
2% to 8% hydrocarbon impregnated particulate ammonium nitrate.

4,878,923

APPARATUS FOR REMOVING OIL FROM A COMPRESSED GAS FLOW

Eduard Muller, Ettenhausen, Switzerland, assignor to Maschinenfabrik Sulzer-Burckhardt AG, Winterthur, Switzerland

Filed Jan. 25, 1989, Ser. No. 301,626
Claims priority, application Switzerland, Feb. 25, 1988, 00707/88
Int. Cl.[4] B01D *46/00*
U.S. Cl. 55—185 6 Claims



1. An apparatus for removing oil from a compressed gas flow comprising

at least one separator having an inlet to receive a flow of compressed gas, means for separating oil from the compressed gas flow, a gas outlet for expelling a flow of gas and an oil outlet for expelling a flow of separated oil; and

a vessel below said separator having an oil inlet selectively connected to said oil outlet of said separator to receive a flow of oil therefrom, a gas inlet selectively connected to said gas outlet of said separator, a gas outlet for expelling gas, a restrictor connected to said gas outlet of said vessel, and an oil outlet for selectively discharging oil therefrom.

4,878,924

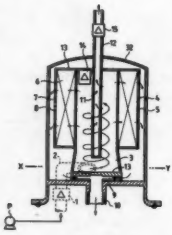
INTEGRATED SEPARATOR FOR SOLID AND GAS CONTAMINANTS IN ENGINE OIL

Hisashi Yano; Hiroyuki Ihara, and Junsuke Yabumoto, all of Kanagawa, Japan, assignors to Mitsubishi Oil Co., Ltd., Tokyo, Japan

Filed Jul. 22, 1988, Ser. No. 223,047
Claims priority, application Japan, Jul. 30, 1987, 62-188976; May 17, 1988, 63-118180
Int. Cl.[4] B01D *19/00*
U.S. Cl. 55—204 8 Claims

1. A separator device for removing both solid and gaseous contaminants from engine oil or the like, comprising: a wall defining a vortex flow chamber, a plurality of small pores being formed in said wall to permit oil stripped of gaseous contaminants to pass therethrough; an oil introduction pipe for

introducing oil into said vortex flow chamber in a tangential direction of said chamber; an oil filter system receiving oil passing through said pores in said wall defining said vortex flow chamber, said oil filter system having a plurality of pores for passing oil filtered of solid contaminants in said oil filter



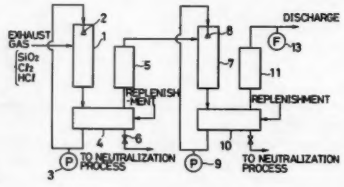
system; a gas removal pipe extending into said vortex flow chamber and disposed substantially at an axial center of said vortex flow chamber, a plurality of small pores being formed in said gas removal pipe for allowing gas-rich oil to pass therethrough; and oil outlet passage means for passing oil filtered by said filter system.

4,878,925

APPARATUS FOR REMOVING FOREIGN SUBSTANCES IN GAS

Hisao Kojima, 3-53-21, Shioiri-cho, Tsurumi-ku, Yokohama-shi, Kanagawa, Japan

Filed Jan. 20, 1988, Ser. No. 146,025
Claims priority, application Japan, Jan. 22, 1987, 62-11227
Int. Cl.[4] B01D *47/00*
U.S. Cl. 55—235 **26 Claims**



1. An apparatus for removing foreign substances in a gas, comprising:

a plurality of right-handed elements, each of the elements having a passage tube through which the gas flows, a spiral blade twisted in the clockwise direction and dividing the inside of the passage tube into a plurality of gas passages, and an auxiliary porous body connected to the passage tube;

a plurality of right-handed elements, each of the elements having a passage tube through which the gas flows, a spiral blade twisted in the clockwise direction and dividing the inside of the passage tube into a plurality of gas passages, and an auxiliary porous body connected to the passage tube;

a plurality of left-handed elements, each of the elements having a passage tube through which the gas flows, a spiral blade twisted in the counterclockwise direction and dividing the inside of the passage tube into a plurality of gas passages, and an auxiliary porous body connected to the passage tube, the left-handed elements and right-handed elements having arranged alternately with their passage tubes connected;

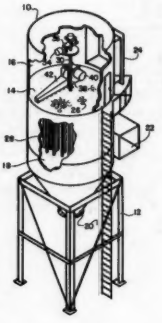
injecting means for injecting a liquid into the elements, and collecting means for collecting the liquid passed through the elements.

4,878,926

DUST COLLECTOR

Robert L. Goodrich, Charlotte, N.C., assignor to Pneumafil Corporation, Charlotte, N.C.

Filed Aug. 16, 1988, Ser. No. 232,808
Int. Cl.[4] B01D *41/00*
U.S. Cl. 55—294 **6 Claims**



1. In a dust collector apparatus that includes a housing and a plurality of filter elements secured to a grid plate for receiving cleaning air through openings in said grid plate, and that includes a blower means having a drive motor integrally secured thereto for providing a continuous flow of cleaning air that is delivered to a plenum means for discharging said cleaning air into said openings in said grid plate, the improvement comprising:

(a) stanchion means disposed with its extending length arranged generally perpendicular with respect to said grid plate, said stanchion means being mounted in said housing for rotation about the axis of its extending length;

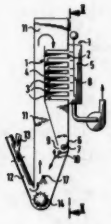
(b) mounting means for mounting said blower means, said blower means drive motor, said plenum means as a fixed integral unit to said stanchion means for rotation therewith, with said plenum being disposed on one side of said axis of rotation of said stanchion means and having its extending length disposed generally radially with respect to said axis of rotation and with said blower means and said blower means drive motor being disposed on the opposite side of said axis of rotation so that the weight of said blower means and said blower means drive motor will counterbalance at least in part the weight of said plenum means, said blower means having its air discharge end fixed to said plenum means so that air discharged from said blower means travels directly into said plenum means in a flow path that is essentially straight and directed along said extending length of said plenum means; and

(c) drive means for rotating said stanchion means, said plenum means, said blower means and said blower means motor as an integral unit about said axis rotation.

4,878,927
FILTERING SEPARATOR FOR PARTICLES AND HARMFUL GASES FROM UNREFINED GASES

Adolf Margraf, Am Schleplingsbach 46, D-3060 Stadthagen, Fed. Rep. of Germany

Filed Oct. 21, 1987, Ser. No. 111,781
Claims priority, application Fed. Rep. of Germany, Oct. 22, 1986, 3635921; Nov. 21, 1986, 3639824
Int. Cl.[4] B01D *46/00*
U.S. Cl. 55—302 **10 Claims**

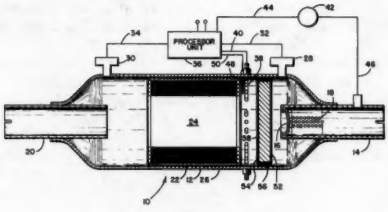


1. A filtering separator comprising a housing, a perforated partition wall in said housing which subdivides the housing into a filtering space fed with an unrefined gas, and a clean gas space, means defining an unrefined gas guiding space disposed adjacent said filtering space, filtering elements on said partition wall, means for cleaning said filtering elements, a dust collecting trough, a dust conveyor associated with said trough, wherein said dust collecting trough traverses said unrefined gas guiding space and is provided at one end with an opening to a lower part of said unrefined gas guiding space, said trough being open to said filtering space, whereby the dust settled on the surface of said filtering elements during cleaning the gas being partially removed and returned to said filtering elements by a flow of unrefined gas, and means arranged in said lower part of said unrefined gas guiding space for mechanically loosening and crushing the dust which is removed by said filtering elements from the unrefined gas in order to make the dust capable of being carried with the unrefined gas back to said filtering elements in said filtering space.

4,878,928
APPARATUS FOR INCREASING REGENERATIVE FILTER HEATING ELEMENT TEMPERATURE

Wayner M. Wagner, Apple Valley, and Douglas E. Flemming, Rosemount, both of Minn., assignors to Donaldson Company, Inc., Minneapolis, Minn.

Filed Jul. 28, 1988, Ser. No. 225,477
Int. Cl.[4] B01D *46/00*
U.S. Cl. 55—466 **1 Claim**



1. Filter apparatus for reducing particulates from exhaust gases from an engine, comprising:

a housing having a chamber with an inlet, an outlet, and a fluid flow path leading from said inlet upstream to said outlet downstream;

means, within said chamber along said fluid flow path, for filtering the particulates from said exhaust gases, said filtering means including a ceramic filter element having an inlet end;

means for regenerating said ceramic filter element, said regenerating means including an electrical heating element with first and second sides, said heating element being supported by said housing, said heating element having a surface temperature;

a porous ceramic disc between said inlet to said chamber and said heating element, said disc having a side facing said heating element, said facing side including a black coating thereon, said disc being spaced from said heating element, said disc being supported by said housing;

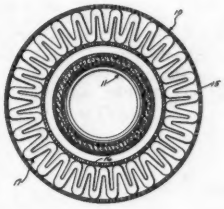
said regenerating means including means for blowing air through said porous ceramic disc and said heating element toward the inlet end of said filter element tom initiate and maintain regenerative combustion; and

means for controlling said regenerative means.

4,878,929
LIQUID-GAS SEPARATOR

Kenneth M. Tofsland; Jeffrey S. Morgan; Eric G. Grytten Holm, and Tadeusz Jaroszczyk, all of Stoughton, Wis., assignors to Nelson Industries Inc., Stoughton, Wis.

Filed Feb. 1, 1989, Ser. No. 304,707
Int. Cl.[4] B01D *46/12*
U.S. Cl. 55—486 **12 Claims**



1. A gas liquid separator, comprising a casing having an inlet to receive a gas containing entrained liquid and having an outlet, first stage filter means disposed within the casing, second stage filter means disposed within the casing and located downstream of said first stage filter means, said first stage filter means including a coalescor section composed of unwoven fibrous material having an average fiber diameter of 0.5 to 50 microns and having a Frazier permeability of 3 to 100, said first stage filter means also including a disloader section disposed downstream and in engagement with said coalescor section and composed of a plurality of contiguous layers of snythetic fibers coated with a resin having a low surface energy, said disloader section having a Frazier permeability of 10 to 600, said second stage filter means consisting of a mass of filter media having a greater permeability than said coalescor section.

4,878,930
FILTER CARTRIDGE

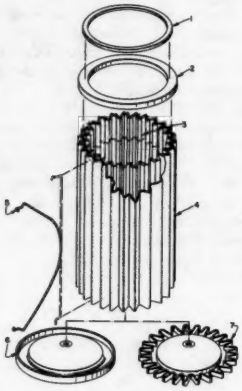
James L. Manniso, Newark; Eugene W. Sieber, Bear, and Glenn R. Voshell, Newark, all of Del., assignors to W. L. Gore & Associates, Inc., Newark, Del.

Filed Mar. 15, 1984, Ser. No. 589,731
Int. Cl.[4] B01D *27/06*
U.S. Cl. 55—493 **9 Claims**

1. An improved gas filter cartridge comprising:

(a) an inner pleated wire support frame capable of supporting a correspondingly pleated filter medium;

(b) a pleated filter medium supported on said inner wire support frame;
(c) an outer filter medium-support wire stay disposed at the inner apex of each pleat of said filter medium and;



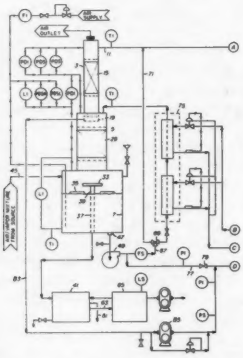
(d) end caps into which the ends of said filter medium pleats, said inner wire support frame, and said outer filter medium-support wires stays are sealed.

4,878,931

TWO STAGE VAPOR RECOVERY SYSTEM

David C. H. Grant, Gainesville, Fla., assignor to Quadrex HPS Inc., Gainesville, Fla.

Filed Aug. 29, 1988, Ser. No. 237,744
Int. Cl.[4] F25J *3/00*
U.S. Cl. 62—17 **11 Claims**



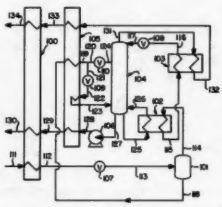
1. A process for removing solvent vapor from an air/solvent vapor mixture comprising the steps of:
(a) conducting the air/solvent vapor mixture through a condenser column;
(b) simultaneously conducting liquid solvent at a temperature above 32° F. countercurrently through the condenser column thereby condensing a portion of the solvent vapor in the air/solvent vapor mixture to form a first condensate;
(c) conducting the air/solvent mixture exiting the condenser column through a stripper column;
(d) simultaneously conducting liquid solvent at a temperature below 32° F. countercurrently through the stripper column thereby condensing substantially all of the solvent vapor in air/solvent vapor mixture exiting the condenser column to form a second condensate.

4,878,932

CRYOGENIC RECTIFICATION PROCESS FOR SEPARATING NITROGEN AND METHANE

Ravindra F. Phade, Getzville, and James R. Handley, Amherst, both of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Mar. 21, 1988, Ser. No. 326,727
Int. Cl.[4] F25J *3/02*
U.S. Cl. 62—24 **15 Claims**



1. A process for separating nitrogen and methane comprising
(A) separating a feed comprising methane and nitrogen into a nitrogen-enriched vapor portion and a methane-enriched liquid, portion;
(B) condensing the nitrogen-enriched vapor portion and introducing resulting condensed nitrogen-enriched vapor into a main column operating within the range of from 15 to 200 psia;
(C) subcooling the methane-enriched liquid portion and dividing resulting subcooled methane-enriched liquid into first and second parts;
(D) introducing the first part into said main column;
(E) at least partially vaporizing the second part by indirect heat exchange with said subcooling methane-enriched liquid portion;
(F) introducing the at least partially nitrogen-enriched vaporized second part into said main column;
(G) separating the condensed vapor portion, subcooled first part, and at least partially vaporized second part by cryogenic rectification within the main column into nitrogen-richer vapor and methane-richer liquid; and
(H) removing nitrogen-richer vapor and methane-richer liquid from the main column.

4,878,933

APPARATUS FOR FUSION SPLICING OPTICAL FIBERS

Takeshi Yamada, Sakura; Yasukuni Osato, Narashino; Okosu Watanabe, Chiba; Masao Suzuki, Sakura; Osamu Kawata, and Koushi Ishihara, both of Mito, all of Japan, assignors to Fujikura Ltd. and Nippon Telegraph & Telephone Public Corporation, both of Tokyo, Japan

Continuation of Ser. No. 713,194, Mar. 18, 1985, abandoned. This application Dec. 16, 1986, Ser. No. 941,563
Claims priority, application Japan, Sep. 1, 1984, 59-183321; Sep. 1, 1984, 59-183322; Jan. 14, 1985, 60-4756
Int. Cl.[4] C03B *23/207*
U.S. Cl. 65—29 **7 Claims**

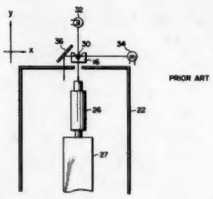
1. An apparatus for fusion slicing optical fibers comprising:
posts;
a base supported by said posts;
a pair of V-shaped blocks, and mounting means for moving said blocks on said base in rectilinear X and Y directions defining a plane, said blocks having V-shaped slots adapted for receiving optical fibers the axis of each of

which is substantially perpendicular to said plane, and said V-shaped slots being in line with each other;

light source means for emitting light consisting substantially of parallel light rays incident in said X direction;

deflecting means provided above said base for receiving a first group of said light rays prior to its passage through said optical fibers, and for deflecting said first group of light rays to pass through said optical fibers in said Y direction, and said deflecting means also receiving a second, different group of said light rays incident in said X direction after its passage through said optical fibers, and for deflecting said second group of light rays to said Y direction;

a microscope, provided under said base, including means for observing an opposed state of said optical fibers received



in said slots, said observing means receiving said first group of light rays deflected to pass through said optical fibers in said Y direction to observe displacement of said optical fibers relative to each other in said X direction, and for receiving said second group of light rays deflected, after passing through said optical fibers, to said Y direction to observe displacement of said optical fibers relative to each other in said Y direction, said observing means including shifting means for adjusting the axis of the microscope along the X direction into alignment, respectively, with the deflected first group of light rays and the deflected second group of light rays; and

means associated with said base for adjusting positions of said optical fibers relative to each other on the basis of an observation by said microscope.

4,878,934

PROCESS AND APPARATUS FOR COATING GLASS

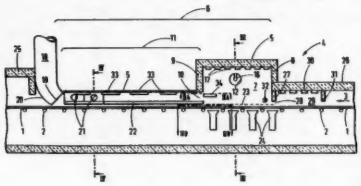
Jean-Francois Thomas, Ottignies; Robert Terneu, Thiméon; Albert Van Cauter, Charleroi, and Robert Van Laethem, Loverval-Gerpinnes, all of Belgium, assignors to Glaverbel, Brussels, Belgium

Continuation of Ser. No. 930,756, Nov. 14, 1986, abandoned. This application Jan. 19, 1988, Ser. No. 147,551

Claims priority, application United Kingdom, Dec. 20, 1985, 8531424

Int. Cl.[4] C03C *17/09*

U.S. Cl. 65—60.52 **46 Claims**



1. A process for pyrolytically forming a metal oxide coating on an upper face of a hot glass substrate in sheet or ribbon form, comprising:

conveying the hot glass substrate in a downstream direction along an apparatus having a coating path with an extended coating path length of at least 2 m and including a coating chamber and a passageway defined within the apparatus, the coating path leading beneath the coating chamber and the coating chamber opening downwardly onto the upper face of the hot glass substrate;

introducing oxidizing gas and coating precursor material into a mixing zone of the coating chamber, which coating precursor material is in the form of a volatilizable solution comprised of solvent and a metallic compound, which metallic compound is soluble in the solvent and is pyrolyzable by the hot glass substrate to form a metal oxide coating thereon and which coating chamber is positioned within or adjacent to the upstream end of said passageway;

supplying heat energy to the mixing zone to vaporize the coating precursor material and to maintain the coating precursor material in the vapor phase, wherein the coating precursor material in the vapor phase and oxidizing gas are thoroughly mixed in the mixing zone while exposed to the hot glass substrate but wherein mixing occurs at a height above the hot glass substrate such that metal oxide coating formation commences from and continues from a substantially homogeneous vapor mixture and wherein introduction of the coating precursor material into the mixing zone is made by spraying from a height of at least 50 cm above the level of the upper face of the hot glass substrate; and

causing the substantially homogeneous vapor mixture to flow continuously from the coating chamber along the coating path and in contact with the upper face of the substrate by pressure lowering means.

20. Apparatus for use in pyrolytically forming a metal oxide coating on an upper face of a hot glass substrate in sheet or ribbon form, the apparatus comprising:

conveyor means for conveying the hot glass substrate in a downstream direction along a coating path with an extended coating path length of at least 2 m;

a roof structure defining a coating chamber opening downwardly onto the coating path and a passageway, wherein the coating chamber is positioned within or adjacent to the upstream end of the passageway and comprises a mixing zone;

means for injecting oxidizing gas into the mixing zone;

means for injecting coating precursor material in the form of a volatilizable solution comprised of solvent and a metallic compound, which metallic compound is soluble in the solvent and is pyrolyzable by the hot glass substrate to form a metal oxide coating thereon, into the mixing zone by spraying from a height of at least 50 cm above the level of the upper face of the hot glass substrte;

means for supplying heat energy to the mixing zone to vaporize the coating precursor material and to maintain the coating precursor material in the vapor phase so that the coating precursor material in the vapor phase and the oxidizing gas are mixed to form a coating atmosphere comprising a substantially homogeneous vapor mixture of coating precursor vapor and oxidizing gas, the mixing zone being in communication with the passageway to permit a stream of the coating atmosphere to flow along the passageway from the mixing zone; and

pressure lowering means for causing the coating atmosphere to flow continuously from the coating chamber along the coating path and in contact with the upper face of the substrate.

4,878,935
SUPPORTING MECHANISM FOR MOULD SIDE PORTIONS IN A GLASSWARE FORMING MACHINE

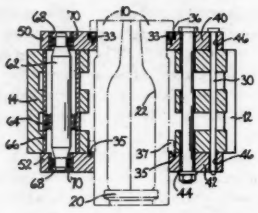
Johann Zeifkovits, Forch, Switzerland, assignor to Emhart Industries Inc., Farmington, Conn.

Filed Dec. 6, 1988, Ser. No. 280,769

Claims priority, application United Kingdom, Dec. 29, 1987, 8730248

Int. Cl.[4] C03B *9/353*

U.S. Cl. 65—323 **2 Claims**



1. An individual section glassware forming machine for carrying out glassware forming processes in a mold or molds comprising a plurality of opposing mold supporting portions which when clamped together form at least one mold having a vertical axis, each of said mold supporting portion including

a top plate including a mold engaging portion which is to be proximate an upper portion of a mold,

a bottom plate including a mold engaging portion which is to be proximate a lower portion of a mold, and

a body portion extending between said top and bottom plates,

means for mounting said top and bottom plates for rotational displacement about a vertical axis so that each of said plates can rotate to bring its mold engaging portion into engagement with a mold including

vertical shaft means,

means for mounting said vertical shaft means in said body portion for pivotal displacement about a horizontal axis, and

bearing means for pivotally interconnecting said top and bottom plates to opposing ends of said vertical shaft means, whereby

one of said plates can be displaced toward a mold while the other of said plates will be displaced away from a mold so that said plates can automatically compensate for a mold axis which is not precisely vertically oriented.

4,878,936
METHOD TO ENHANCE ROOT NODULATION IN LEGUMES AND INOCULUM PREPARATION THEREFOR

Jo E. Handelsman, and Larry J. Halverson, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Jul. 27, 1987, Ser. No. 77,937

Int. Cl.[4] C05F *11/08;* C12R *1/085*

U.S. Cl. 71—7 **4 Claims**

1. A method for enhancing nodulation in legumes growing in a growing medium comprising the step of placing in the growing medium in the immediate vicinity of the roots of the legume the nodulation of which is to be enhanced an effective quantity of an enhancing bacteria selected from the group consisting of *Bacillus cereus* ATCC 53522, and enhancing mutants thereof.

4,878,937
HERBICIDAL SULFONAMIDES

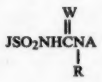
Donald J. Dumas, and Marcus P. Moon, both of Wilmington, Del., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Division of Ser. No. 926,732, Nov. 4, 1986, Pat. No. 4,752,322, which is a continuation-in-part of Ser. No. 845,703, Apr. 2, 1986, abandoned, which is a continuation-in-part of Ser. No. 733,906, May 14, 1985, abandoned. This application Feb. 12, 1988, Ser. No. 155,962

Int. Cl.[4] A01N *43/66;* C07D *401/12, 411/12, 251/46*

U.S. Cl. 71—90 **27 Claims**

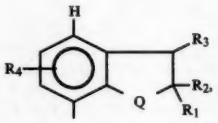
1. A compound of the formula



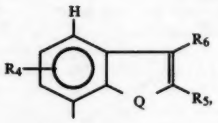
I

wherein

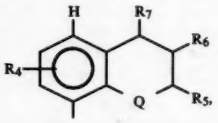
J is



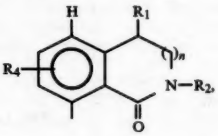
J-1



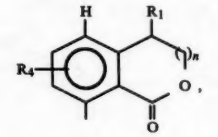
J-2



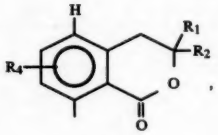
J-3



J-4



J-5



J-6

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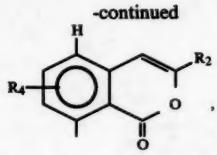

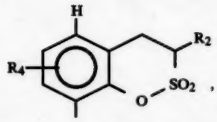

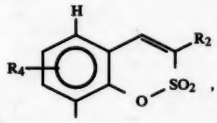

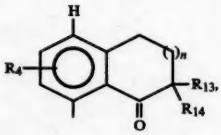

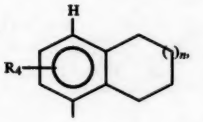

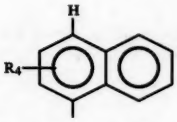

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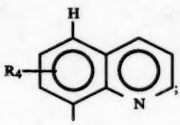
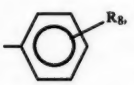
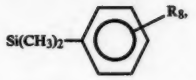


n is 0 or 1;
W is O or S;
Q is O, S, SO or SO_2;
R is H or CH_3;
R_1 is H or CH_3;
R_2 is H or C_1–C_3 alkyl;
R_3 is H or CH_3;
R_4 is C_3–C_6 cycloalkyl, C_5–C_6 cycloalkenyl,



$Si(CH_3)_2(C_1$–C_4 alkyl), $Si(CH_3)_2(C_2$–C_4 alkenyl), $Si(CH_3)_2(C_1$–C_3 alkoxy),

J-7



$P(O)(CH_3)_2$, $P(O)(OCH_3)_2$, CN, C_1–C_4 alkylcarbonyl, C_3–C_4 cycloalkylcarbonyl, NR_9R_{10} or C_1–C_2 alkyl substituted with C_3–C_5 cycloalkyl, C_1–C_3 alkoxy, C_1–C_3 haloalkoxy, C_2–C_3 alkenyloxy, C_2–C_3 haloalkenyloxy, C_1–C_3 alkylthio, C_1–C_3 haloalkylthio, C_1–C_3 alkylsulfinyl, C_1–C_3 alkylsulfonyl, C_1–C_3 haloalkylsulfinyl, C_1–C_3 haloalkylsulfonyl, $Si(CH_3)_2(C_1$–C_4 alkyl), NO_2, CN, C_1–C_2 alkylcarbonyl, OH, NR_9R_{10}, $CO_2(C_1$–C_3 alkyl), SCN, $P(O)(OCH_3)_2$ or $SO_2NR_{11}R_{12}$;

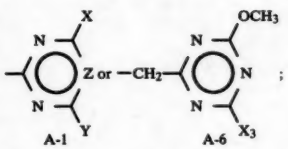
J-8

J-9 R_5 is H or C_1–C_2 alkyl;
R_6 is H or CH_3;
R_7 is H or CH_3;
R_8 is H, F, Cl, Br, CH_3, OCH_3 or SCH_3;
R_9 is H or C_1–C_3 alkyl;
R_{10} is H or C_1–C_3 alkyl; or
R_9 and R_{10} may be taken together to form $(CH_2)_4$, $(CH_2)_5$ or $CH_2CH_2OCH_2CH_2$;

J-10

R_{11} and R_{12} are independently H or C_1–C_3 alkyl;
R_{13} is H, C_1–C_3 alkyl, Cl or Br;
R_{14} is H, CH_3, Cl or Br;
A is

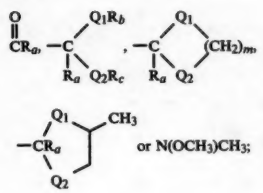
J-11



A-1 A-6

J-12 X is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_2–C_4 halo-alkoxy, C_1–C_4 haloalkyl, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino, di(C_1–C_3 alkyl)amino or C_3–C_5 cycloalkyl;
Y is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_2–C_4 halo-alkoxy, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino, di(C_1–C_3 alkyl)amino, C_3–C_4 alkenyloxy, C_3–C_4 alkynyloxy, C_2–C_5 alkylthio alkyl, C_2–C_5 alkylsulfinylalkyl, C_2–C_5 alkyl sulfonylalkyl, C_1–C_4 haloalkyl, C_2–C_4 alkynyl, azido, cyano,

J-13



m is 2 or 3;
Q_1 and Q_2 are independently O or S;
R_a is H or C_1–C_3 alkyl;
R_b and R_c are independently C_1–C_3 alkyl;
Z is N; and
X_3 is CH_3 or OCH_3;
and their agriculturally suitable salts; provided that
(a) when W is S, then R is H, A is A-1, and Y is CH_3, OCH_3, OC_2H_5, CH_2OCH_3, C_2H_5, CF_3, SCH_3, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or

(b) when R_1 is CH_3, then n is O;
(c) when J is J-6, then R_1 and R_2 are not both H;
(d) when the total number of carbons of X and Y is greater than four, then the number of carbons of R_4 must be less than or equal to three;
(e) when J is J-12, then R_4 is other than C_1–C_4 alkylcarbonyl; and
(f) when J is J-7 or J-9, then R_4 is other than CN.

10. An agriculturally suitable composition for controlling the growth of undesirable vegetation comprising an effective amount of a compound of claim **1** and at least one of a surfactant, solid or liquid diluent.

4,878,938

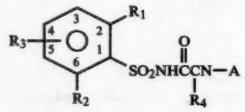
HERBICIDAL SULFONAMIDES

Mary A. Hanagan, Blue Bell, Pa., assignor to E. I. Du Pont De Nemours and Company, Wilmington, Del.

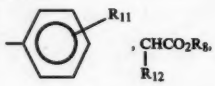
Division of Ser. No. 78,154, Jul. 27, 1987, Pat. No. 4,764,204, which is a division of Ser. No. 841,109, Mar. 18, 1986, Pat. No. 4,705,556, which is a division of Ser. No. 628,259, Jul. 12, 1984, Pat. No. 4,604,131, which is a continuation-in-part of Ser. No. 520,801, Aug. 5, 1983, abandoned. This application May 18, 1988, Ser. No. 196,629

Int. Cl.[4] **C07D** *239/69, 403/12, 401/12;* **A01N** *43/54*
U.S. Cl. 71—92 **27 Claims**

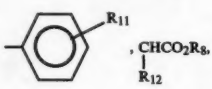
1. A compound of the formula:



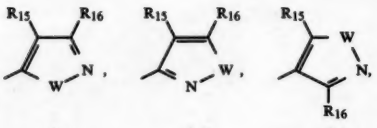
wherein
R_1 is $S(O)_nR_5$, NR_6R_7, CO_2R_8, $SO_2NR_9R_{10}$,



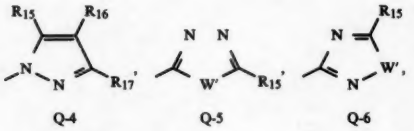
OSO_2R_{13}, CH_2OR_{14} or Q;
R_2 is $S(O)_mR_5$, NR_6R_7, CO_2R_8, $SO_2NR_9R_{10}$,



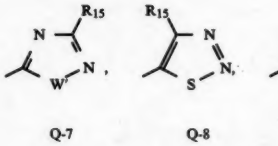
OSO_2R_{13}, CH_2OR_{14} or Q;
R_3 is H, Cl, F, Br, CH_3, OCH_3 or CF_3;
R_4 is H or CH_3;
R_5 is C_1–C_3 alkyl;
R_6 and R_7 are independently CH_3 or CH_2CH_3;
R_8 is C_1–C_3 alkyl, $CH_2CH{=}CH_2$, CH_2CH_2Cl or $CH_2CH_2OCH_3$;
R_9 is CH_3 or OCH_3;
R_{10} is C_1–C_3 alkyl;
R_{11} is H, Cl, Br, F, CH_3 or OCH_3;
R_{12} is H or CH_3;
R_{13} is C_1–C_3 alkyl or CF_3;
R_{14} is C_1–C_3 alkyl or CF_2H;
n is 0, 1 or 2;
m is 0 or 1;
Q is



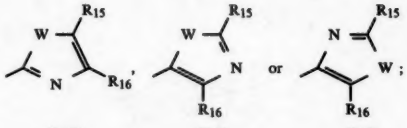
Q-1 Q-2 Q-3



Q-4 Q-5 Q-6

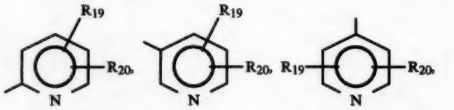


Q-7 Q-8 Q-9

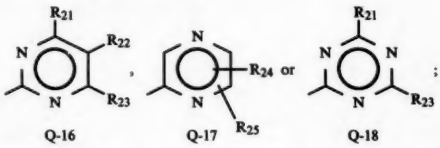


Q-10 Q-11 Q-12

W is O, S or NR_{18};
W' is O or S;
R_{15}, R_{16}, R_{17} and R_{18} are independently H or CH_3;
Q is also

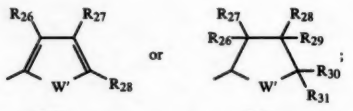


Q-13 Q-14 Q-15



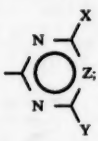
Q-16 Q-17 Q-18

R_{19}, R_{20}, R_{22}, R_{24} and R_{25} are independently H or CH_3;
R_{21} and R_{23} are independently H, CH_3 or OCH_3;
Q is also



Q-19 Q-20

R_{26}, R_{27}, R_{28}, R_{29}, R_{30} and R_{31} are independently H or CH_3;
A is



A-1

Z is CH;
X is CH_3, OCH_3, Cl, OCH_2CH_3, OCF_2H or F;
Y is H, NH_2, $NHCH_3$, $N(CH_3)_2$, CH_3, CH_2CH_3, CF_3, CH_2OCH_3, $CH_2OCH_2CH_3$, $O(C_1–C_3$ alkyl), SCH_3, $O(C_3–C_4$ alkenyl), $O(C_3–C_4$ alkynyl), OCH_2CF_3, OCH_2CH_2F, OCH_2CH_2Cl, OCH_2CH_2Br or OCF_2H;
and agriculturally suitable salts thereof; provided that
(a) R_1 and R_2 are not simultaneously CO_2R_8;
(b) when either one of R_1 or R_2 is $SO_2NR_9R_{10}$, then the other must not be $S(O)_nR_5$, $S(O)_mR_5$, CH_2OR_{14} or NR_6R_7;
(c) when R_9 is OCH_3, then R_{10} is CH_3;
(d) when either one of R_1 or R_2 is CO_2R_8, then the other must not be $S(O)_nR_5$, $S(O)_mR_5$ or NR_6R_7;
(e) the total number of carbon atoms in R_{26} to R_{31} combined, is equal to or less than four;
(f) when X is Cl or F, then Y is NH_2, $NHCH_3$, $N(CH_3)_2$, OCH_3 or OCH_2CH_3;
(g) when R_1 is CO_2R_8 then R_2 is not OSO_2R_{13}; and
(h) when X or Y is OCF_2H, then R_2 is Q.

10. An agriculturally suitable composition for controlling the growth of undesired vegetation comprising an effective amount of a compound of claim **1** and at least one of the following: surfactant, solid or liquid diluent.

4,878,939
FUNGICIDAL AND PLANT-GROWTH REGULATING AZOLYL ETHER KETONES AND ALCOHOLS

Gerhard Jäger, Leverkusen; Manfred Jautelat, Burscheid; Wolfgang Krämer, Burscheid; Karl H. Büchel, Burscheid; Paul Reinecke, Leverkusen; Wilhelm Brandes, Leichlingen; Gerd Hänssler, Leverkusen, and Klaus Lürssen, Bergisch Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

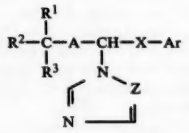
Continuation of Ser. No. 930,634, Nov. 13, 1986, abandoned. This application Oct. 13, 1988, Ser. No. 258,108

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1985, 3540523

Int. Cl.[4] A01N *43/653, 43/50;* **C07D** *249/08, 233/60*

U.S. Cl. 71—92 **10 Claims**

1. An azolyl ether ketone or alcohol of the formula



in which
R^1 represents straight-chain or branched alkyl with 2 to 4 carbon atoms,
R^2 represents straight-chain or branched alkyl with 2 to 4 carbon atoms,
R^3 represents straight-chain or branched alkyl with 1 to 4 carbon atoms,
A represents a keto group or a CH(OH) grouping,
Z represents a nitrogen atom or a CH group,
X represents oxygen and
AR represents phenyl which is unsubstituted or mono- or di-substituted by substituents independently selected from the group consisting of fluorine, chlorine and phenyl,
or an addition product thereof with an acid or metal salt.

4,878,940
HERBICIDAL 1,5-SUBSTITUTED 1H-IMIDAZOLES

Marcel F. L. De Bruyn, Hoogstraten; Guy R. E. Van Lommen, Berlaar, both of Belgium, and William R. Lutz, Riehen, Switzerland, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

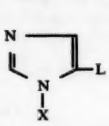
Filed Mar. 25, 1988, Ser. No. 173,511

Claims priority, application United Kingdom, Apr. 2, 1987, 8707856; Dec. 22, 1987, 8729798

Int. Cl.[4] A01N *43/50;* **C07D** *233/64*

U.S. Cl. 71—92 **11 Claims**

1. A compound of the formula:



(I)

or a stereochemically isomeric form thereof, or a salt thereof, wherein:
L represents —C(=G)—R wherein G is oxo, thioxo, or R^5imino wherein R^5 represents hydrogen, C_{1-5}alkyl, or OR^4 wherein R^4 represents hydrogen, aryl, C_{1-12}alkyl, aryl-C_{1-12}alkyl, C_{1-5}alkylcarbonyl, arylcarbonyl, or C_{1-5}alkylaminocarbonyl, and wherein R is hydrogen, C_{1-7}alkyl, C_{3-7}cycloalkyl, fluoroC_{1-5}alkyl, arylC_{1-5}alkyl, or aryl; and
X represents 1-indanyl, 1-tetrahydro-naphthyl, or 5-benzocycloheptanyl, each of which groups can be unsubstituted or can have one to six substituents selected from the group consisting of C_{1-5}alkyl, mono- and di(aryl)C_{1-5}alkyl, C_{1-5}alkoxy, halo, C_{3-7}alkenyl, amino, nitro, C_{1-5}alkylcarbonylamino, trifluoromethyl, and difluoromethoxy; and each aryl is phenyl or phenyl substituted with one to three substituents each independently selected from C_1–C_5alkyl, C_1–C_5alkoxy and halo.

5. A method of controlling weeds by applying thereto or to the locus thereof of a herbicidally effective amount of a compound of formula (I) as claimed in claim **1**.

4,878,941
HERBICIDES

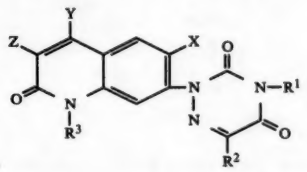
George Theodoridis, Princeton, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed Dec. 29, 1987, Ser. No. 139,404

Int. Cl.[4] A01N *43/207;* **C07D** *403/04*

U.S. Cl. 71—93 **49 Claims**

1. A herbicidal compound of the formula



in which:
R^3 is H, alkyl, alkenyl, alkynyl, haloalkyl, haloalkenyl, alkoxyalkyl, alkoxyalkoxyalkyl, cycloalkyl, alkylthioalkyl, benzyl, cyanoalkyl, alkoxycarbonylalkyl, hydroxy or alkoxy;
X is H, halogen, alkyl, or haloalkyl;

Y is H, halogen, alkyl, haloalkyl, alkoxycarbonyl, cyano, or nitro;

Z is H, halogen, alkyl, haloalkyl, alkoxy, alkenyl, alkynyl, haloalkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkoxycarbonyl, cyano, or nitro;

R^1 is alkyl, alkenyl, alkynyl, haloalkyl, alkoxyalkyl, or haloalkoxyalkyl; and

R^2 is H, alkyl, haloalkyl, alkoxy, haloalkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, or halogen;

and in which any alkyl, alkenyl, alkynyl or alkylene group or moiety has up to 6 carbon atoms and any cycloalkyl has 3 to 7 ring carbon atoms.

4,878,942

BENZAMIDE DERIVATIVE, PROCESS FOR ITS PRODUCTION AND PLANT GROWTH REGULANT

Takeo Motegi; Mitsumasa Yamazaki; Hiroyuki Iguchi, and Kaoru Kasahara, all of Tokyo, Japan, assignors to Hodogaya Chemical Co., Ltd., Tokyo, Japan

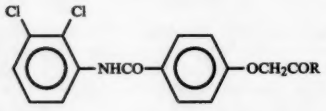
Filed Jul. 21, 1988, Ser. No. 222,256

Claims priority, application Japan, Jul. 23, 1987, 62-182369

Int. Cl.[4] A01N *37/38*

U.S. Cl. 71—109 **4 Claims**

1. A benzamide derivative of the formula:



(I)

wherein R is hydroxyl, alkoxy, alkoxyalkoxy, alkoxyalkoxyalkoxy, alkenylalkoxy, alkenylalkoxyalkoxy, alkynylalkoxy, alkynylalkoxyalkoxy, monoalkylamino, dialkylamino or O-cat wherein cat is an inorganic or organic cation.

4,878,943

PROCESS OF DEZINCIFYING A MATERIAL FLOW WHEN OPERATING A PIG-IRON PRODUCTION PLANT

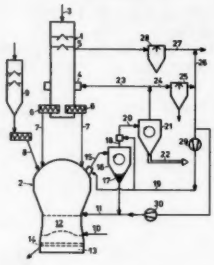
Werner Kepplinger, Linz, Austria, assignor to Deutsche Voest-Alpine Industrieanlagenbau GmbH, Dusseldorf, Fed. Rep. of Germany

Filed Nov. 7, 1988, Ser. No. 267,977

Claims priority, application Austria, Nov. 12, 1987, 2994/87

Int. Cl.[4] C21B *13/14*

U.S. Cl. 75—25 **1 Claim**



1. In a process for producing pig iron in a pig iron production plant including a direct reduction shaft furnace defining a reduction zone and a meltdown gasifier defining a meltdown zone, said process comprising:

reducing iron-oxide containing particulate charging substances in said direct reduction shaft furnace by a reducing gas so as to obtain sponge iron particles,

melting said sponge iron particles in said meltdown gasifier by supplying coal and oxygen-containing gas thereby forming said reducing gas,

cooling and dedusting said reducing gas so as to obtain dedusted reducing gas and separated dust.

supplying said dedusted reducing gas to said reduction zone of said direct reduction shaft furnace and recycling said separated dust to said meltdown zone of said meltdown gasifier, and

washing and cooling excess reducing gas so as to make said excess reducing gas available to external consumers,

the improvement wherein zinc is removed from said reducing gas is carried out in two steps in a consecutively arranged first cyclone and second cyclone by

adjusting the temperature of said reducing gas exiting said meltdown gasifier to about 1,000° C. in said first cyclone so as to partially dedust said reducing gas an d produce a first zinc-poor dust comprising coal particles, and recycling said dust to said meltdown gasifier; and

cooling said partially dedusted reducing gas obtained from said first cyclone to about 800° C. by feeding cooling gas into said partially dedusted gas and further dedusting said reducing gas in said second cyclone so as to produce a purified gas and a second dust enriched with deposited metallic zinc, and collecting said metallic zinc as a zinc concentrate for further utilization,

wherein said cooling gas comprises a portion being cooled before introduction into the second cyclone.

4,878,944

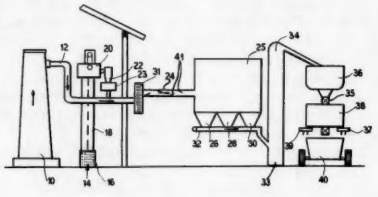
METHOD OF TREATING METALLIC OXIDE IMPREGNATED DUST

Thomas E. Rolle, and D. J. Rapp, both of Dubuque, Iowa, assignors to The TDJ Group, Inc., Dubuque, Iowa

Filed Oct. 18, 1988, Ser. No. 262,103

Int. Cl.[4] C21C *5/38*; F23J *15/00*

U.S. Cl. 75—25 **24 Claims**



1. A process for treating and collecting metallic oxide impregnated dust generated during a manufacturing process comprising the steps of:

passing particulate material through at least one enclosed area and toward a waste collection device;

feeding an additive into the enclosed area to be mixed with the particulate material to create an additive-particulate material, upstream from the waste collection device; and

passing the additive-particulate material mixture into the waste collection device.

4,878,945

HYDROMETALLURGICAL PROCESS FOR TREATING REFRACTORY ORES CONTAINING PRECIOUS METALS

Rein Raudsepp, 4539 Quebec St., and Morris J. Beattie, 2955 W. 38th Ave., both of Vancouver, B. C., Canada

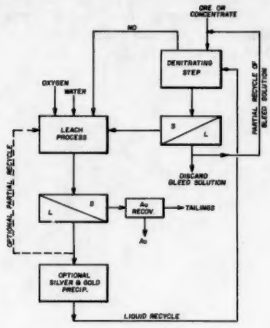
Continuation-in-part of Ser. No. 868,029, May 29, 1986, abandoned. This application Sep. 18, 1987, Ser. No. 98,517

Int. Cl.[4] C22B *11/04*

U.S. Cl. 75—118 R **18 Claims**

1. In a process for recovering precious metals from pyritic

and arsenopyritic concentrates and ores involving decomposing the arsenopyrite or pyrite concentrates and ores in acidic leach solution in a common volume space which contains a gas phase and a liquid slurry which comprises a liquid phase and a solid phase through the action of higher valence oxidized nitrogen species in which the nitrogen has a valence of at least plus 3, the active oxidized nitrogen species being regenerated in the same common volume space by oxygen containing gas, the improvement which comprises, prior to decomposing said concentrate or ore in said common volume space, introducing the concentrate or ore into a denitrating vessel along with



solution from the leach solution, reacting essentially all of the oxidized nitrogen species in the leach solution in the denitrating vessel with concentrate or ore to produce in the denitrating vessel nitric oxide, which is released into an oxygen free gas phase and is transported to the gas phase of the common volume space, subjecting the liquid and solid products of the denitrating vessel top a solid-liquid separation, transporting the solids from the separation to the common volume space where the solids are treated with oxygen and with nitric oxide from said denitrating vessel, and bleeding the remaining liquid which is free of oxidized nitrogen species from the process.

4,878,946

HOT-MELT TYPE INK FOR THERMAL INK-JET PRINTER

Isao Tabayashi, Kuki; Hiroshi Harada, Takaishi; Sadahiro Inoue, Chiba, and Hiroshi Fukutomi, Urawa, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Filed Feb. 26, 1988, Ser. No. 160,877

Claims priority, application Japan, Feb. 27, 1987, 61-42846

Int. Cl.[4] C09D *11/06*

U.S. Cl. 106—27 **7 Claims**

1. A hot-melt type ink for thermal ink-jet printers which comprises an oil-soluble dye dissolved in at least one compound selected from the group consisting of a phosphoric acid ester, a hydroxybenzoic acid ester and a phthalic acid ester, the compound being in solid state at room temperature.

4,878,947

METHOD FOR MANUFACTURE OF POROUS REFRACTORY ARTICLES

Richard L. Helferich, Clayton, Ohio, assignor to The Duriron Company, Inc., Dayton, Ohio

Continuation of Ser. No. 127,654, Dec. 2, 1987, abandoned. This application Dec. 22, 1988, Ser. No. 290,815

Int. Cl.[4] C04B *38/00, 41/91*

U.S. Cl. 106—75 **11 Claims**

1. A process for lowering the alkali metal content of a porous, unfired, supportable ceramic shape containing alkali metal so as to increase the refractoriness and thermal shock resistance of fired porous ceramic articles made therefrom, comprising the steps of first contacting said porous ceramic shape with water to remove therefrom leachable alkali metal compounds, and thereafter contacting said porous ceramic shape with a dilute aqueous solution of an ammonium salt selected from the group consisting of ammonium acetate, ammonium bicarbonate, ammonium carbonate, ammonium chloride, ammonium hydroxide, ammonium sulfate, and mixtures thereof, to effect exchange of ammonium ion for remaining alkali metal ion in said porous ceramic shape to an extent such that a fired porous ceramic article made from said porous, unfired, supportable ceramic shape contains less than about 0.5 percent by weight alkali metal.

4,878,948

WATER RESISTANCE ADDITIVE FOR CEMENTITIOUS COMPOSITIONS

Virendra V. Shah, Macungie, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed May 18, 1988, Ser. No. 195,738

Int. Cl.[4] C04B *24/08*

U.S. Cl. 106—90 **10 Claims**

1. In a cementitious composition comprising cement, aggregate, water soluble or water dispersible polymer and a water resistant additive, the improvement which comprises about 0.5 to 3 wt%, based on cement, of a polyethylene glycol ester of a C_8–C_{22} fatty acid having an HLB value from 11 to 20 as the water resistant additive.

4,878,949

METHOD FOR THE PRODUCTION OF CEMENT CLINKER FROM SEMI-WET RAW MATERIAL

Georg Unland, Ennigerloh, Fed. Rep. of Germany, assignor to Krupp Polysius AG, Fed. Rep. of Germany

Filed Feb. 16, 1988, Ser. No. 156,294

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1987, 3705037

Int. Cl.[4] C04B *7/43*

U.S. Cl. 106—100 **5 Claims**

1. In a method of producing cement clinker from semi-wet raw material from which moisture has been removed to form a filter cake which subsequently is dried in a drying zone and crushed in a crushing zone, and wherein the dried and crushed material is heated and deacidified in a preheating zone and then burnt to clinker in a combustion zone and finally cooled in a cooling zone, the improvement comprising supplying exhaust air from said cooling zone directly to said drying zone bypassing the combustion zone and the preheating zone, and adjusting the quantity of said exhaust air to reduce the moisture content of said filter cake and maintain the moisture content of said filter cake prior to crushing thereof at not more than about 2% to maintain substantially constant the degree of acidification of crushed material delivered to said combustion zone.

4,878,950

BITUMEN COMPOSITION

Andrew Halasz, Dollard des Ormeaux; Giuseppe Spinelli, Baie d'Urfe, both of Canada, and David H. Doolittle, Houston, Tex., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Apr. 29, 1988, Ser. No. 187,700

Int. Cl.[4] C08L *95/00*

U.S. Cl. 106—273.1 **13 Claims**

1. A bitumen composition comprising asphalt and from about 1 wt.% to about 10 wt.%, based on asphalt, of an α-olefin polymer having a molecular weight within the range from about 750 to about 5000.

4,878,951

LOW-FOAMING ALKALINE, HYPOCHLORITE CLEANER

Guy Pochard, Minnetonka, and Creighton Steiner, Brooklyn Park, both of Minn., assignors to A & L Laboratories, Inc., Minneapolis, Minn.

Filed Jan. 17, 1989, Ser. No. 297,422
Int. Cl.[4] C11D *1/22, 3/395;* B08B *9/00*
U.S. Cl. 134—22.17 14 Claims

1. An aqueous alkaline chlorinated cleaning formulation comprising:

(a) an alkaline hydroxide in an amount equivalent to about 5% - 15% sodium hydroxide;

(b) a component providing available chlorine at a level of between about 1% and about 5% available chlorine;

(c) between about 0.1% and about 2% of a surfactant mixture comprising (i) a sulfonate surfactant selected from the group consisting of alkyl diphenyloxide sulfonates, having one or two alkyl groups and two sulfonate groups, the alkyl groups being linear or branched C_4–C_8 alkyl groups, and (ii) a nonionic surfactant selected from the group consisting of poly(oxyethylene)/poly(oxypropylene) block copolymers and polyethoxylated/polypropoxylated aliphatic alcohols; and

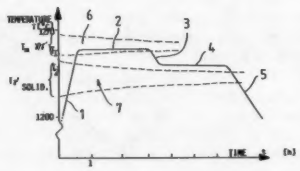
(d) 0 to about 15% of a water softening agent stable to the other components of the formulation, said sulfonate and nonionic surfactants being present in a ratio of between about 2.5:1 and 3.5:1 and said nonionic surfactant selected to provide a substantially clear solution at about 120° F. when combined with the remaining ingredients of the formulation.

4,878,952

PROCESS FOR HEAT TREATING CAST NICKEL ALLOYS

Horst Pillhoefer, Karlsfeld, Fed. Rep. of Germany, assignor to MTU Motoren-und Turbinen-Union Muenchen GmbH, Munich, Fed. Rep. of Germany

Filed Sep. 12, 1988, Ser. No. 243,424
Claims priority, application Fed. Rep. of Germany, Sep. 19, 1987, 3731598
Int. Cl.[4] C22F *1/10*
U.S. Cl. 148—1 2 Claims



1. A process for heat treating structural components made of polycrystalline nickel alloys, comprising the following process steps:

(a) heating the structural component to a temperature T_1 ranging between 0° C. to 10° C. above the incipient melting temperature T_m γ/γ' of the carbidic γ/γ' eutectic phase,

(b) maintaining this temperature T_1 for a length of time sufficient to completely bring into solution and homogenize the partially casting-inducted nonuniform γ' precipitation phase,

(c) cooling to a temperature T_2 below T_m γ/γ' but above the solution temperature T of the γ' precipitation hardening phase,

(d) maintaining this temperature T_2 under hydrostatic pressure between 900 to 2000 bars until the fusion porosity is eliminated, and

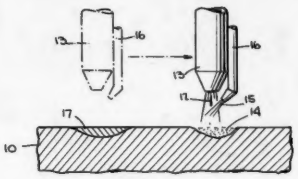
(e) cooling at a rate required for producing the desired γ' precipitation particle phase.

4,878,953

METHOD OF REFURBISHING CAST GAS TURBINE ENGINE COMPONENTS AND REFURBISHED COMPONENT

Gilbert A. Saltzman, Howell; Timothy A. Wertz, Manahawkin, and Ira L. Friedman, Rumson, all of N.J., assignors to Metallurgical Industries, Inc., Tinton Falls, N.J.

Filed Jan. 13, 1988, Ser. No. 143,513
Int. Cl.[4] C21D *1/09*
U.S. Cl. 148—4 12 Claims



1. A process of refurbishing a superalloy casting comprising the steps of

generating a plasma arc between an electrode and a section of the casting to be refurbished under an electric current of less than 30 amps to melt a surface of said section into a shallow pool of molten metal without detrimentally heating the casting;

delivering a controlled amount of welding powder of the same composition as the superalloy casting into said arc at a point slightly above said molten pool for heating and delivery to said molten pool; and

subsequently solidifying the delivered powder and molten pool into an overlay, having a high integrity cast structure metallurgically bonded to said casting and being of the same composition as the casting.

4,878,954

PROCESS FOR IMPROVING THE DUCTILITY OF A PRODUCT OF ALLOY INVOLVING MARTENSITIC TRANSFORMATION AND USE THEREOF

Alain Dubertret, Sevres, and Bernard Prandi, Faverges, both of France, assignors to Compagnie Europeenne Du Zirconium Cezus, Courbevoie, France

Filed Jun. 17, 1988, Ser. No. 208,035
Claims priority, application France, Jun. 24, 1987, 87 09272
Int. Cl.[4] C22C *9/01;* C22F *1/08, 1/10*
U.S. Cl. 148—11.5 F 14 Claims

1. A process for improving the ductility of a shape-memory alloy product based on Ti-Ni involving martensitic transformation, comprising at least one thermal treatment cycle of alternating cold and hot treatments, wherein

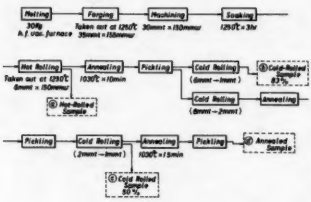
the first said thermal treatment cycle comprises a cold treatment of the product at a temperature both lower than −50° C. and lower than (M_s−50° C.) where M_s is the temperature at which martensitic transformation of the product begins, and a hot treatment of the product at a temperature of 700°–900° C., which does not result in recrystallization of the product.

4,878,955

PROCESS FOR PREPARING A HIGH STRENGTH STAINLESS STEEL HAVING EXCELLENT WORKABILITY AND FREE FORM WELD SOFTENING

Kazuo Hoshino, and Takashi Igawa, both of Yamaguchi, Japan, assignors to Nisshin Steel Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 900,455, Aug. 26, 1986, abandoned. This application Jun. 23, 1988, Ser. No. 210,399
Claims priority, application Japan, Aug. 27, 1985, 60-186605
Int. Cl.[4] C21D *8/02*
U.S. Cl. 148—12 E **12 Claims**



10. Process for preparing a high strength stainless steel material having excellent workability and free from weld softening consisting of a single martensitic phase or a duplex phase structure of martensite and minute austenite, said process comprising heat-treating at a temperature of 550° to 675° C. for 1 to 30 hours a cold-rolled material of a steel wherein no annealing treatment is performed between a final cold rolling step and said heat-treatment step, said steel consisting essentially of:

C: not more than 0.10%

Si: 0.85–4.5%

Mn: 0.20–5.0%

P: not more than 0.060%

S: not more than 0.030%

Cr: 10.0–17.0%

Ni: 3.0–8.0%

N: not more than 0.10%

At least one of Cu, Mo, W and Co: not more than 4% in total

At least one of Ti, Nb, V, and Zr not more than 1% in total and Fe and inevitable incidental impurities, wherein the Ni_{eq} value defined as:

$Ni_{eq}+Ni+Mn+0.5Cr+0.3Si+Cu+Mo+W+0.2Co$ is in the range of 13.0–17.5.

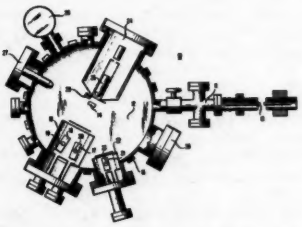
4,878,956

SINGLE CRYSTAL FILMS OF CUBIC GROUP II FLUORIDES ON SEMICONDUCTOR COMPOUNDS

Wilbur D. Johnston, Jr., Mendham, and Charles W. Tu, Basking Ridge, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 6,989, Jan. 14, 1987, abandoned, which is a continuation of Ser. No. 554,793, Nov. 23, 1983, abandoned. This application Mar. 9, 1989, Ser. No. 320,884
Int. Cl.[4] H01L *29/201, 29/78*
U.S. Cl. 148—33.3 **11 Claims**

1. A semiconductor device comprising semiconductor material, said semiconductor material consisting essentially of at least one III-V semiconductor compound in which at least part of the surface of the semiconductor material is covered with an insulating film characterized in that the insulating film is an epitaxial film of cubic Group II fluoride which is grown in the temperature range of 150 degrees C. below the decomposition temperature of the III-V semiconductor and at a growth rate of least 250 Angstroms per hour and is substantially twin-free and substantially single crystal, and the cubic Group II fluoride



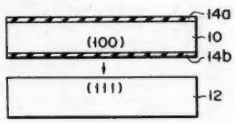
is selected from the group consisting of $Ca_xSr_{1-x}F_2$ and $Ba_ySr_{1-y}F_2$ where x and y vary from 0 to 1.

4,878,957

DIELECTRICALLY ISOLATED SEMICONDUCTOR SUBSTRATE

Yoshihiro Yamaguchi, Urawa; Kiminori Watanabe, Kawasaki; Akio Nakagawa, Hiratsuka; Kazuyoshi Furukama, Kawasaki; Kiyoshi Fukuda, and Katsujiro Tanzawa, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 30, 1989, Ser. No. 330,492
Claims priority, application Japan, Mar. 31, 1988, 63-78714; Jul. 14, 1988, 63-173701
Int. Cl.[4] H01L *21/265*
U.S. Cl. 148—33.3 **5 Claims**



1. A semiconductor substrate comprising:

(a) a first semiconductive layer;

(b) a second semiconductive layer; and

(c) an insulative layer sandwiched between said first and second semiconductive layers, said first semiconductive layer being a first silicon layer having a (100) or (110) crystal surface orientation, and said second semiconductive layer being a second silicon layer having a (111) crystal surface orientation.

4,878,958

METHOD FOR PREPARING RARE EARTH-IRON-BORON PERMANENT MAGNETS

Mohammad H. Ghandehari, Brea, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 869,045, May 30, 1986, Pat. No. 4,747,874. This application Apr. 4, 1988, Ser. No. 177,056
The portion of the term of this patent subsequent to Aug. 9, 2005, has been disclaimed.
Int. Cl.[4] H01F *1/09*
U.S. Cl. 148—103 **23 Claims**

18. A method for producing a permanent magnet, comprising the steps of:

(a) mixing together the components:

(i) a particulate alloy consisting essentially of neodymium, iron, and boron;

(ii) particulate aluminum; and

(iii) a particulate rare earth oxide selected from the group

consisting of gadolinium oxide, terbium oxide, dysprosium oxide, holmium oxide, and mixtures thereof;
(b) aligning magnetic domains of the mixture in a magnetic field;
(c) compacting the aligned mixture to form a shape;
(d) sintering the compacted shape; and
(e) annealing the sintered shape.

4,878,959

METHOD OF PRODUCING GRAIN-ORIENTED SILICON STEEL WITH SMALL BORON ADDITIONS

Carl P. Stroble, Natrona Heights, and Anthony P. More, Cheswick, both of Pa., assignors to Allegheny Ludlum Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 58,078, Jun. 4, 1987, abandoned. This application Apr. 13, 1989, Ser. No. 337,593
Int. Cl.[4] H01F *1/04*
U.S. Cl. 148—111 **9 Claims**

1. A method of producing cube-on-edge grain-oriented silicon steel having improved core loss and magnetic permeability values, the method comprising:
making a silicon steel melt composition, by weight percent, of about 2 to 4.5 silicon, up to 0.06 carbon, up to .008 nitrogen, 0.04 to 0.100 manganese, 0.016 to 0.035 of material selected from the group consisting of sulfur and selenium, the balance iron and incidental impurities;
casting the melt to form a casting thereof;
hot rolling the casting at greater than 2300° F. to form a hot-rolled band, said band having a manganese-to-sulphur and/or selenium ratio of greater than 2.5;
cold working the hot-rolled band to an intermediate gauge strip of about 0.018 to 0.026 inch by a reduction of at least 60%;
annealing the intermediate gauge to effect primary recrystallization;
cold working the intermediate annealed gauge steel strip to a final gauge of about 0.0045 to 0.012 inch by a cold reduction of about 65% to 75% the final gauge steel strip having 3 to less than 10 ppm boron therein prior to final texture annealing;
annealing to effect decarburization;
applying to the final gauge steel strip a refractory coating; and
final texture annealing the final gauge steel for a time and temperature to develop secondary recrystallization with grain sizes of less than 10 mm and a permeability at 10 oersteds of 1850 or more.

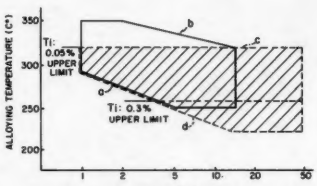
9. A method of producing cube-on-edge grain-oriented silicon steel having improved core loss and magnetic permeability values, the method comprising;
making a silicon steel melt composition, by weight percent, of about 2 to 4.5 silicon, 0.028 to 0.04 carbon, 0.003 to 0.0065 nitrogen, 0.068 to 0.085 manganese, 0.024 to 0.028 of material selected from the group consisting of sulfur and selenium, the balance iron and incidental impurities;
adding sufficient boron to the melt to produce 3 to 7 ppm boron in a final gauge steel strip prior to final texture annealing;
casting the melt to form a casting thereof; hot rolling the casting at greater than 2300° F. to form a hot-rolled band, said band having a manganese-to-sulphur and/or selenium ratio of 2.5 or more;
cold working the hot-rolled band to an intermediate gauge strip of about 0.020 to 0.026 inch by a reduction of 60 to 70%;
annealing to effect primary recrystallization;
cold working the intermediate annealed gauge steel strip to a nominal final gauge of 0.007 to 0.009 inch by a cold reduction of 65 to 75%; then
annealing to effect decarburization;
applying a refractory oxide coating; and
final texture annealing the final gauge steel for a time and temperature to develop secondary recrystallization with grain sizes of less than 10 mm and a permeability at 10 oersteds of 1850 or more.

4,878,960

PROCESS FOR PREPARING ALLOYED-ZINC-PLATED TITANIUM-KILLED STEEL SHEET HAVING EXCELLENT DEEP-DRAWABILITY

Nobuhiko Sakai; Yukio Uchida, both of Amagasaki; Eizo Wada, Izumisano, and Yusuke Hirose, Osaka-Sayama, all of Japan, assignors to Nisshin Steel Company, Ltd., Tokyo, Japan

Filed Feb. 6, 1989, Ser. No. 307,673
Int. Cl.[4] C23C *16/02*
U.S. Cl. 148—127 **1 Claim**



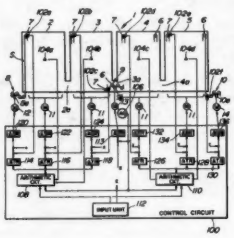
1. A process for preparing alloyed-zinc-plated steel sheet having excellent deep drawability, which comprises adjusting the temperature of substrate steel sheet of titanium-killed steel essentially consisting of C≦0.01%, Si<0.15%, Mn: 0.15–0.85%, Ti: 0.05–0.30% P≦0.02%, S≦0.02%, Al≦0.05% and balance of Fe, to a temperature within a temperature range T(°C.) defined as $180 \leqq T \leqq -240 \times W + 292$, wherein W(%) is the Ti content of the substrate steel sheet, subjecting said steel sheet to Zn-plating by vacuum vapor deposition, and thereafter maintaining the plated steel sheet for alloying the plating zinc layer and the substrate steel at 220°–320° C. for 1~50 hours in accordance with Ti content of the substrate steel.

4,878,961

METHOD AND SYSTEM FOR CONTROLLING TENSION TO BE EXERTED ON METAL STRIP IN CONTINUOUS ANNEALING FURNACE

Yasuhiro Yamaguchi; Yuji Shimoyama; Tateo Ohnishi, and Hironobu Ohno, all of Chiba, Japan, assignors to Kawasaki Steel Corp., Japan

Filed Sep. 30, 1987, Ser. No. 102,875
Claims priority, application Japan, Sep. 30, 1986, 61-231579; Dec. 9, 1986, 61-292955
Int. Cl.[4] C21D *11/00*
U.S. Cl. 148—128 **35 Claims**



1. A system for controlling tension to be exerted on a metal strip in a continuous annealing furnace which includes a plural-

ity of hearth rolls for defining a path for the metal strip, comprising:

tensioning means for exerting tension on said metal strip as it travels through said continuous annealing furnace along said path;

monitoring means for monitoring a preselected operation parameter of said annealing furnace, which operation parameter effects a variation of the magnitude of the effective roll crown on said hearth rolls;

crown deriving means for deriving an effective roll crown magnitude on the basis of said operation parameter as monitored; and

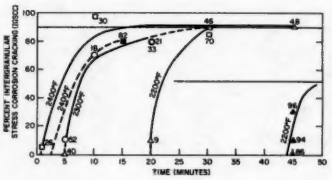
tensioning deriving means for deriving an optimum tension range to be applied to the strip on the basis of said operation parameter and connected for controlling said tensioning means for adjusting the tension to be exerted on said metal strip so that the tension to be exerted on the metal strip is maintained within said optimum tension range.

4,878,962

TREATMENT FOR INHIBITING IRRADIATION INDUCED STRESS CORROSION CRACKING IN AUSTENITIC STAINLESS STEEL

Alvin J. Jacobs, San Jose, and Gerald M. Gordon, Soquel, both of Calif., assignors to General Electric Company, San Jose, Calif.

Filed Jun. 13, 1988, Ser. No. 206,144
Int. Cl.[4] C21B *6/00*
U.S. Cl. 148—136 **6 Claims**



1. A method of inhibiting stress corrosion cracking attributable mainly to exposure to concentrated irradiation in austenitic stainless steel comprising heat treating a stainless steel consisting of an alloy consisting essentially of in approximate percentage by weight:

Chromium	18 to 20
Nickel	8 to 14
Carbon	0.08 maximum
Manganese	2.0 maximum
Silicon	1.0 maximum
Molybdenum	3.0 maximum
Iron	Balance

by maintaining the mass of said alloy at a temperature within the range of at least 2050° F. up to about 2400° F. for a period of at least about 1 minute up to about 45 minutes with the period of heat treatment of the alloy being approximately inversely proportional to the temperature of the treatment.

4,878,963

CORROSION RESISTANT ALUMINUM COATING COMPOSITION

John W. Bibber, Batavia, Ill., assignor to Sanchem, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 86,362, Aug. 17, 1987, Pat. No. 4,755,224, which is a continuation-in-part of Ser. No. 908,827, Sep. 18, 1986, Pat. No. 4,711,667. This application Mar. 18, 1988, Ser. No. 170,169
Int. Cl.[4] C23C *22/66*
U.S. Cl. 148—262 **11 Claims**

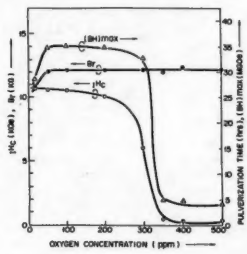
1. An alkali metal permanganate coating composition for aluminum and aluminum alloys comprising a basic pH and having as the essential ingredients thereof n alkali metal permanganate, an alkali metal chloride and a phosphorous compound selected from the group consisting of alkali metal phosphate and phosphoric acid.

4,878,964

PERMANENT MAGNETIC ALLOY AND METHOD OF MANUFACTURING THE SAME

Tetsuhiko Mizoguchi; Koichiro Inomata, both of Yokohama; Toru Higuchi, Yamagata, and Isao Sakai, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Division of Ser. No. 11,609, Feb. 6, 1987, Pat. No. 4,793,874, which is a division of Ser. No. 773,547, Sep. 9, 1985, Pat. No. 4,664,724. This application Sep. 27, 1988, Ser. No. 249,945
Claims priority, application Japan, Sep. 14, 1984, 59-191810; Mar. 30, 1985, 60-66848; Mar. 30, 1985, 60-66849
Int. Cl.[4] H01F *1/04*
U.S. Cl. 148—302 **9 Claims**



1. A permanent magnet manufactured by a process, comprising the steps of:

melting a raw material essentially consisting of 10 to 40% by weight of R, 0.1 to 8% by weight of boron, 50 to 300 ppm by weight of oxygen and the balance of iron, where R is at least one component selected from the group consisting of yttrium and rare-earth elements;

casting a melt of raw material to obtain a block;

pulverizing the block to a powder of an average particle size of 2 to 10 μm;

compressing the powder while applying a magnetic field; and

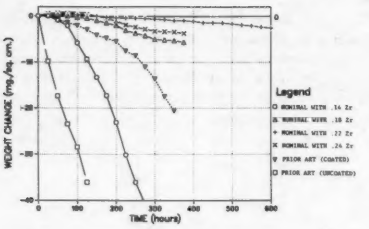
sintering a resultant compact at a temperature of 1,000° to 1,200° C. for 0.5 to 5 hours.

4,878,965

OXIDATION RESISTANT SUPERALLOY SINGLE CRYSTALS

William J. Gostic, Jupiter; Abdus S. Khan, Palm Beach Gardens, and Kenneth S. Murphy, Juno Beach, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 5, 1987, Ser. No. 105,625
Int. Cl.[4] C22C *19/05*
U.S. Cl. 148—404 **2 Claims**



2. A single crystal gas turbine engine turbine blade consisting essentially of

4–7.5% Al, 7–18% Cr, 0–1.9% Co, 0–12% W, 1–10% Ta, 0–3% Mo, 0–0.5% Cb, 0–3% Re, 0–1.2% Ti, 0–0.5% C, <0.05% B, 0.15%–0.30% Zr, 0–0.5% Hf, 7–17% (W+Ta+Mo+Cb+Re), bal Ni and a small but effective amount of zirconium from about 0.21 to about 0.30% whereby, upon exposure to engine operating conditions said blade forms an adherent protective scale and is thereby made useable in uncoated form at temperatures of 2000° F. and above.

4,878,966

WROUGHT AND HEAT TREATED TITANIUM ALLOY PART

Edouard Alheritiere, Ugine, and Bernard Prandi, Faverges, both of France, assignors to Compagnie Europeenne du Zirconium Cezus, Courbevoie, France

Division of Ser. No. 181,715, Apr. 14, 1988, Pat. No. 4,854,977. This application Oct. 26, 1988, Ser. No. 262,792
Claims priority, application France, Apr. 16, 1987, 87 05786
Int. Cl.[4] C22F *1/18*
U.S. Cl. 148—421 **2 Claims**

1. A wrought and heat treated titanium alloy part, comprising, by weight: Al 4.5 to 5.4%, Sn 1.8 to 2.5%, Zr 3.5 to 4.8%, Mo 2.0 to 4.5%, Cr 1.5 to 2.5%, Cr+V 1.5 to 4.5%, Fe 0.7 to 1.5%, O 0.07 to 0.13%, the remainder being Ti and impurities, said part having a fine and regular alpha-beta structure and essentially segregation free microstructures, and having the mechanical characteristics: $R_m \geqq 1200$ MPa, $R_{p0.2} \geqq 1000$ MPa, $A\% \geqq 5$, K_{1C} at 20° C. $\geqq 45$ MPa.$\sqrt{m}$, creep at 400° C. under 600 MPa: 0.5% in more than 200 hours.

4,878,967

RAPIDLY SOLIDIFIED ALUMINUM BASED, SILICON CONTAINING ALLOYS FOR ELEVATED TEMPERATURE APPLICATIONS

Colin M. Adam; Richard L. Bye, both of Morristown; Santosh K. Das, Randolph, and David J. Skinner, Long Valley, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation of Ser. No. 782,774, Oct. 2, 1985, abandoned. This application Sep. 8, 1987, Ser. No. 96,293
Int. Cl.[4] C22C *21/00*
U.S. Cl. 148—437 **12 Claims**

1. A rapidly solidified aluminum-base alloy consisting essentially of the formula $Al_{bal}Fe_aSi_bX_c$, wherein X is at least one element selected from the group consisting of Mn, V, Cr, Mo, W, Nb, Ta, "a" ranges from 2.0 to 7.5 at %, "b" ranges from 0.5 to 3.0 at %, "c" ranges from 0.05 to 3.5 at % and the balance is aluminum plus incidental impurities, with the proviso that the ratio (Fe+X):Si ranges from about 2.0:1 to 5.0:1, said alloy having an aluminum solid solution phase containing

therein a substantially uniform distribution of dispersed, intermetallic phase precipitates, each of said precipitates being of approximate composition $Al_{12}(Fe,X)_3Si$, measuring less than about 100nm in any dimension thereof and having a cubic structure.

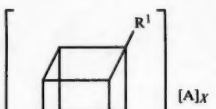
4,878,968

OXIDIZING SALTS OF CUBYL AMINES

Rodney L. Willer, Newark; Glen T. Cunkle, Wilmington, both of Del., and Nathan Klein, Baltimore, Md., assignors to Morton Thiokol, Inc., Chicago, Ill.

Filed Jan. 12, 1988, Ser. No. 143,496
Int. Cl.[4] C06B *31/00*; C07C *87/40, 87/453*
U.S. Cl. 149—45 **8 Claims**

1. A compound having the following formula:



wherein R^1 is

$$-N^+H_3;$$

R^2 is selected from R^1, in which case X is 2 divided by the valence of A, and hydrogen, in which case X is 1 divided by the valence of A; and A is an oxidizing anion useful to provide oxidizing capability in a propellant formulation.

5. A liquid propellant consisting essentially of:

A. from about 60% to about 85% by weight of hydroxylammonium nitrate;

B. from about 30% by weight of a compound according to claim 1; and

C. from about 10% to about 20% water.

4,878,969

PROCESS FOR PRODUCING AN ELECTRICALLY INSULATING SHEATHING AROUND A JUNCTION BETWEEN ELECTRICALLY CONDUCTIVE ELEMENTS

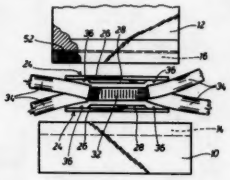
Erich R. Janisch, Heideck, Fed. Rep. of Germany, assignor to Erich Janisch Kunstoffe, Heideck, Fed. Rep. of Germany

Continuation of Ser. No. 909,849, Sep. 22, 1986, abandoned. This application May 20, 1988, Ser. No. 196,467

Claims priority, application Fed. Rep. of Germany, Oct. 18, 1985, 3537167

Int. Cl.[4] H01B *13/06, 13/08*

U.S. Cl. 156—49 **11 Claims**



1. A method of joining and sealingly enclosing conductive end portions of a plurality of electrical conductors each of the type including an elongated conductive wire surrounded by an electrically nonconductive covering except at a stripped end portion thereof, the method comprising the steps of mechanically joining the stripped end portions to each other to form an elongated electrically conductive junction;

forming an enclosing material including two elongated strips of polyvinyl chloride material bonded together to form an inseparable single strip of sheathing material, the polyvinyl chloride material of the two strips having different softening temperatures;

placing two portions of elongated strips of the sheathing material on opposite sides of the junction formed by the mechanically joined stripped end portions with the strips of sheathing material extending generally perpendicular to the longitudinal direction of the junction and with the material having the lower softening temperature adjacent the stripped end portions and with the sheathing material overlapping the covering material;

applying pressure and vibratory energy to the outer surfaces of the sheathing material to cause the material with the lower softening temperature to flow around and into the junction until the sheathing material has formed a complete sealing enclosure around the conductive stripped end portions and the adjacent portions of the covering material; and

allowing the sheathing material to harden.

4,878,970

HEATING OF A FOAM CUP TO INCREASE STIFFNESS

John C. Schubert, and Edward C. Leduc, both of Marietta, Ga., assignors to Amoco Corporation, Chicago, Ill.

Filed May 27, 1988, Ser. No. 199,666

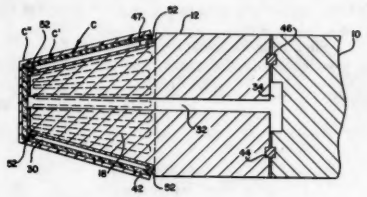
Int. Cl.[4] B32B *31/26*

U.S. Cl. 156—69 **13 Claims**

1. A method of providing a foam cup having a sidewall and a bottom, said cup having an improved sidewall deflection strength and being suitable for use with hot beverages, comprising:

(a) forming the foam cup from a roll stock of a polystyrene foam by rolling said roll stock into shape to form the sidewall, subsequently forming the bottom of the cup from said roll stock and sealing the bottom to the sidewall of the foam cup,

(b) placing said cup around a heated mandrel, said mandrel having an outside diameter sufficiently less than the inside diameter of the cup so that the sidewall of the cup is not in contact with the mandrel, and



(c) maintaining the cup around said mandrel at a temperature and for a time sufficient to expand the sidewall of the cup to increase the sidewall deflection strength of the cup.

4,878,971

METHOD OF CONTINUOUSLY ASSEMBLING CHEMICAL ANALYSIS SLIDES

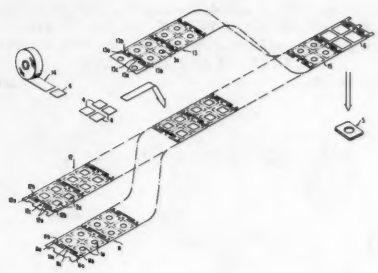
Yuzo Tsunekawa; Yukio Ishida, and Tatsuo Shiino, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 27, 1988, Ser. No. 148,834

Claims priority, application Japan, Jan. 28, 1987, 62-18111

Int. Cl.[4] B32B *31/10, 31/08*

U.S. Cl. 156—70 **3 Claims**



1. A method of continuously assembling chemical analysis slides each including at least two plastic sheets superposed one on another and bonded together, and a chemical analysis film sandwiched therebetween in which while at least two plastic sheets in continuous lengths are conveyed in the longitudinal direction thereof, a plurality of chemical analysis films are sandwiched between the plastic sheets at predetermined intervals, the plastic sheets are bonded together at a portion circumscribing each of the chemical analysis films sandwiched therebetween to form a sheet assembly and individual chemical analysis slides are cut out from the sheet assembly,

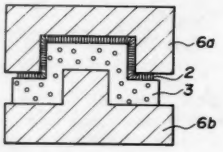
characterized in that at least one of the sheets in continuous lengths is provided with a plurality of slit means extending in the transverse direction of the sheet at regular intervals at the remaining portions of the sheet which do not form a part of the chemical analysis slide.

4,878,972

PROCESS FOR PREPARING TWO-PLY FOAM MOLDED ARTICLES

Katsutoshi Kaneko; Toshio Kobayashi, and Mitsuru Watari, all of Ichihara, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Aug. 18, 1988, Ser. No. 233,541
Claims priority, application Japan, Aug. 20, 1987, 62-207628
Int. Cl.[4] B32B *31/20, 5/20*
U.S. Cl. 156—78 13 Claims



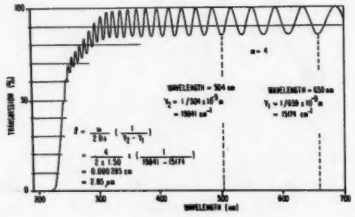
1. A process for preparing a two-ply foam molded article, characterized by heating to a melted and softened state a foamable polyolefin sheet which is in its not yet foamed state to form a foamed polyolefin layer, integrally laminating a fabric on one side of the resulting foamed polyolefin layer which is still in a melted and softened state to form a laminate and simultaneously drawforming the resulting laminate to shape the two-ply foam molded article.

4,878,973

PROCESS FOR PRODUCING A THIN RESIN FILM

Etsuo Ohtake, Kanagawa; Kaoru Yamaki, and Takayuki Kuroda, both of Hyogo, all of Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 504,752, Jun. 15, 1983, abandoned.
This application Aug. 19, 1985, Ser. No. 767,239
Claims priority, application Japan, Jun. 15, 1982, 57-103488
Int. Cl.[4] B29D *7/01;* B32B *31/04*
U.S. Cl. 156—85 10 Claims



1. A process for producing a transparent thin film of unoriented cellulose ester held under uniform tension, the process including the steps of:

casting a solution of cellulose ester in an organic solvent free from plasticizer over a smooth glass plate and thereafter removing the solvent to form a transparent thin film of a uniform thickness on the glass plate;

permitting the transparent thin film to separate from the glass plate by immersing the same into water; and

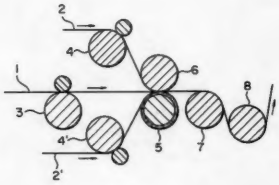
recovering the transparent thin film from the water and setting and subsequently bonding the moist film on a supporting mount, followed by drying the same.

4,878,974

METHOD OF PRODUCING A GAS-PERMEABLE, WATERPROOF COMPOSITE SHEET

Seiji Kagawa, Yokohama, Japan, assignor to Tonen Sekiyukagaku Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 6, 1989, Ser. No. 306,178
Claims priority, application Japan, Feb. 5, 1988, 63-25200; Aug. 25, 1988, 63-211118; Sep. 16, 1988, 63-231900
Int. Cl.[4] B32B *31/20*
U.S. Cl. 156—85 24 Claims



1. A method of producing a waterproof, gas-permeable composite sheet comprising the steps of:

(a) preparing a film from a composition comprising 40–70 weight % of an ethylene-propylene-diene copolymer and 30–60 weight % of an ethylene-vinyl acetate copolymer; and

(b) adhering said film to a woven or nonwoven fabric by hot pressing while causing the heat shrinkage of said film simultaneously, thereby making said film microporous.

4,878,975

METHOD FOR PRODUCING A RIGID SHAPED BODY

Harald Schobermayer, 9/4 Heipelweg, A-8706 Leoben, Austria

Division of Ser. No. 820,712, Jan. 17, 1986, Pat. No. 4,748,042.
This application May 10, 1988, Ser. No. 192,136
Claims priority, application Austria, Jan. 25, 1985, 201/85
Int. Cl.[4] B29C *55/12;* B29D *9/00;* B32B *31/12*
U.S. Cl. 156—163 9 Claims

1. A method of forming a rigid shaped body which comprises at leat ten high melting point thermoplastic layers having a high molecular orientation alternating with low melting point thermoplatic layers substantially without molecular orientation, the low melting point layers comprising up to about 20 volume percent of the volume of the rigid shaped body, the method comprising the steps of:

adjacently arranging a plurality of at least ten high melting point thermoplastic carriers having a high molecular orientation and having coatings of low melting point thermoplastic thereon so that the coatings contact each other, the combined thickness of any two adjacent coatings being lower than the thickness of one of the carriers; and

commonly pressing said adjacently arranged carriers having coatings thereon at a temperature in the range of or above the crystallite melting temperature or the glass temperature of the coatings and below the crystallite melting temperature or the glass temperature of the carriers, such that the coatings of adjacent thermoplastic carriers bond together to form a rigid shaped body without altering said high molecular orientation of said thermoplastic carriers.

4,878,976

METHOD FOR CONTINUOUSLY MANUFACTURING SYNTHETIC RESIN TUBE

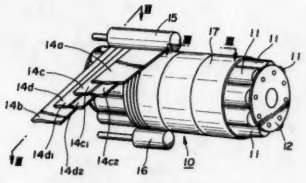
Hiroshi Asakura, Kamakura, Japan, assignor to Toyo Chemical Co., Ltd., Kamakura, Japan

Filed Dec. 13, 1988, Ser. No. 283,967

Claims priority, application Japan, Dec. 17, 1987, 62-319927; Jan. 18, 1988, 63-7675

Int. Cl.[4] B31C *13/00*

U.S. Cl. 156—190 10 Claims



1. A method for continuously manufacturing a synthetic resin tube comprising the steps of:

arranging in a circular array a plurality of rollers each rotating at the same speed such that an imaginary cylinder is defined about its central axis by said rollers, the longitudinal axes of said rollers being parallel to each other but offset with respect to said central axis;

continuously passing a plurality of pre-molded flat strips of synthetic resin material through a heating zone to thereby heat the pre-molded flat strips to a temperature of not lower than a softening point of said synthetic resin material and not higher than a melting point of said synthetic resin material, the plurality of said pre-molded flat strips compring a first strip for forming an outermost wall of the tube, a second strip for forming an innermost wall of the tube and at least one intermediate strip for forming an intermediate tube wall sandwiched between said first and second strips;

continuously feeding said flat strips thus heated and softened generally perpendicularly to lengths of said rollers in such a manner that each of said strips is helically wrapped around and advanced axially along said imaginary cylinder with each of the strips displaced along the lengths of said rollers and with portions of adjacent turns of said at least one intermediate strip forming the intermediate tube wall not overlapping one on another; and

pressing at least one pressure roller against the plurality of said flat strips to join and weld the strips together, whereby to form the synthetic resin tube having generally smooth outer and inner wall surfaces.

4,878,977

PROCESS FOR MANUFACTURING SYSTEMATIC COLOR TABLES OR COLOR CHARTS FOR SEVEN-COLOR PRINTING, AND TABLES OR CHARTS PRODUCED BY THIS PROCESS

Harald Kueppers, Im Buchenhain 1, D-6070 Langen, Fed. Rep. of Germany

PCT No. PCT/DE86/00419, § 371 Date Jun. 15, 1987, § 102(e) Date Jun. 15, 1987, PCT Pub. No. WO87/02455, PCT Pub. Date Apr. 23, 1987

PCT Filed Oct. 17, 1986, Ser. No. 64,310

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1985, 3537008

Int. Cl.[4] B32B *31/00*

U.S. Cl. 156—264 8 Claims

1. A method for producing systematic color tables or, respectively, color charts for seven-color printing, whereby the chromatic printing colors yellow, magenta-red, cyan-blue, violet-blue, green and orange-red and the achromatic printing color black are used comprising the steps of printing a plurality of color field tables onto a printing material with inks of two of said chromatic colors together with the achromatic color, black, with the combinations Y/G/S, G/C/S, C/V/S, V/M/S, M/O/S and O/Y/S being produced, where Y represents the color yellow, M represents the color magenta-red, C

represents the color cyan blue, V represents the color violet-blue, G represents the color green and O represents the color orange-red and S represents the color black and wherein said two chromatic colors used are juxtaposed or neighboring and they come together and are overprinted with the achromatic color black to produce the colors on charts or tables.

4,878,978

BONDING METHOD EMPLOYING HIGH PERFORMANCE INDUCTION CURABLE TWO-COMPONENT STRUCTURAL ADHESIVE WITH NONSAGGING BEHAVIOR

Anil B. Goel, Worthington, and Joseph G. Holehouse, Columbus, both of Ohio, assignors to Ashland Oil, Inc., Ashland, Ky.

Division of Ser. No. 876,060, Jun. 19, 1986, Pat. No. 4,762,864. This application Apr. 18, 1988, Ser. No. 182,667

Int. Cl.[4] B32B *31/00*

U.S. Cl. 156—272.4 4 Claims

1. The process comprising placing an adhesive composition between the surfaces of at least two substrates of fiber reinforced plastic material and forming a strong thermoset adhesive bond rapidly between the substrates by subjecting the adhesive composition to electromagnetic induction heating, said adhesive composition comprising a mixture of components (I) and (II) wherein

(I) is an epoxy resin component comprising (a) an epoxy resin, from 1 to 15% by weight of which is a flexible di- or tri-glycidyl ether of a poly(alkylkene glycol); (b) from 1 to 15% by weight of the epoxy resin of a carboxylic acid terminated acrylonitrile-butadiene rubber; and (c) from 2 to 50% by weight of an electromagnetic energy absorbing material selected from the group consisting of particulate, magnetizable iron, cobalt, nickel, alloys of nickel and iron, inorganic oxides of iron, inorganic oxides of nickel, carbonaceous materials and mixtures thereof, and

(II) a hardener component comprising (a) from 50 to 90% by weight of a poly(alkylene oxide) di- or tri-primary amine having a molecular weight greater than 2000, (b) up to 20% by weight of a poly(alkylene oxide) di- or tri-primary amine and/or amido-amine having a molecular weight in the range of from 200 to 600, (c) up to 10% by weight of a compound selected from the group consisting of ethylene diamine, aminoethyl piperazine and diethanol amine, (d) from 2 to 15% by weight of a phenolic compound, (e) up to 15% by weight of an amine cure accelerator selected from the group consisting of tertiary amino group containing molecules and boron trifluoride-amine complexes and (f) from 2 to 60% by weight of an electromagnetic mate-

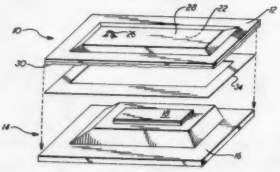
rial selected from the group consisting of particulate, magnetizable iron, cobalt, nickel, alloys of nickel and iron, alloys of nickel and chromium, inorganic oxides of iron, inorganic oxides of nickel, carbonaceous materials and mixtures thereof.

4,878,979

METHOD OF REUSABLY SEALING A SILICONE RUBBER VACUUM BAG TO A MOLD FOR COMPOSITE MANUFACTURE

John Steinbach, Milford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Apr. 25, 1986, Ser. No. 855,980
Int. Cl.[4] B29C *43/12*; B32B *31/00*
U.S. Cl. 156—285 **1 Claim**



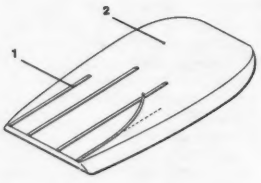
1. A method of reusably sealing a silicone rubber vacuum bag to a mold, comprising:
priming the mold-mating portion of the vacuum bag with a silicone rubber adhesive;
applying a layer of semiadhesive sealer between the primed mold-mating portion of the vacuum bag and the mold;
temporarily securing the primed portion of the silicone rubber vacuum bag to the layer of semiadhesive material and to the mold;
applying vacuum to the mold;
releasing the vacuum;
removing the bag from the mold;
peeling the semiadhesive material from the primed portion of the silicone rubber bag; and
reusing the bag a plurality of times before reapplying additional silicone rubber adhesive to the mold-mating portion of the silicone rubber bag.

4,878,980

POWER RIDGES

Lewis P. Stedman, 24391 La Hermosa, Laguna Niguel, Calif. 92677

Continuation-in-part of Ser. No. 198,635, May 23, 1988, abandoned, which is a continuation-in-part of Ser. No. 68,338, Jul. 1, 1987, abandoned. This application Jan. 7, 1979, Ser. No. 294,898
Int. Cl.[4] B32B *31/00*
U.S. Cl. 156—299 **1 Claim**



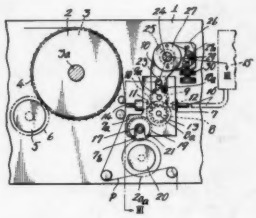
1. A method of improving the performance of wave riding vehicles comprising installing a number of strips of automobile, self-adhesive, flexible plastic, protective side-molding on the bottom of such vehicles so that a portion of the water flow is redirected toward the rear.

4,878,981

FORM COLLATOR GLUING APPARATUS

Mario Mizutani, Yokohama, Japan, assignor to Print Kiko Co., Ltd., Tokyo, Japan

Filed May 17, 1988, Ser. No. 195,018
Claims priority, application Japan, May 22, 1987, 62-125351
Int. Cl.[4] B29C *19/00*
U.S. Cl. 156—356 **2 Claims**



1. A form collator gluing apparatus comprising:
a framework;
a plurality of rollers arranged in said framework, said rollers each having a pinwheel and being driven by a main motor whereby a separate continuous sheet of paper may be hung over each of said rollers and the pinwheel thereof for transfer thereover through said framework;
a gear pump mounted adjacent each of said rollers, each said gear pump having a glue outlet provided with a nozzle in opposing relation to a respective continuous sheet of paper passing over the adjacent roller, an inlet of said gear pump being communicated via a hose with a glue tube, each said gear pump being swingably mounted on said framework for permitting the nozzle of said gear pump to be selectively brought into and out of contact with said respective continuous sheet of paper; and
a cam mounted on said framework for swinging said gear pump with respect to said sheet of paper;
whereby glue discharged from said nozzle can be continuously applied to the respective continuous sheet of paper by maintaining the nozzle in contact with the sheet of paper, and whereby, by said cam swinging said gear pump to bring the nozzle thereof alternately into and out of contact with the sheet of paper, glue discharged from said nozzle can be skippingly applied to the sheet of paper.

4,878,982

APPARATUS FOR SPLICING A REPLACEMENT WEB TO A WEB HAVING A PROGRAMMED MOVEMENT WITHOUT INTERRUPTING SUCH MOVEMENT

Taizo Ogata; Toyoharu Takahashi, both of Chiba, and Kenji Koshiba, Tokyo, all of Japan, assignors to Tokyo Automatic Machinery Works, Ltd. and Japan Tobacco Inc., both of Tokyo, Japan

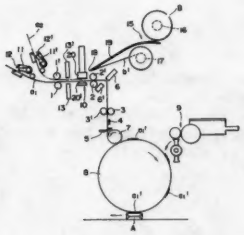
Filed Dec. 24, 1987, Ser. No. 137,571
Claims priority, application Japan, Dec. 25, 1986, 61-312563
Int. Cl.[4] B65H *19/20, 21/02*
U.S. Cl. 156—361 **21 Claims**

1. Apparatus comprising:
(a) a first web supply containing a first web and a second web supply containing a second web;
(b) operable pulling means engaged with said first web for withdrawing the same from said first supply and moving said first web along a predetermined path;
(c) cutter means for severing the first web to establish a

trailing edge thereon, and for severing the second web to establish and a leading edge thereon;

(d) means for detecting the presence of said trailing edge on said path; and

(e) a splicing station position in said path constructed and



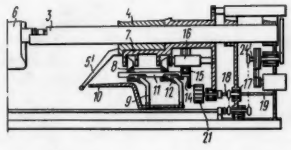
arranged to splice said leading edge of said second web to said trailing edge of said first web while each of said first and second webs lie in a common plane such that the leading edge of the second web abuts the trailing edge of the first web in response to detecting the presence of said trailing edge.

4,878,983

APPARATUS FOR BUILDING PNEUMATIC TIRE COVERS

Lev V. Schadin, ulitsa Avtozavodskaya, 67, kv. 5, and Alexander S. Klimov, ulitsa Klubnaya, 4, kv. 32, both of Yaroslavl, U.S.S.R.

Filed Aug. 6, 1987, Ser. No. 82,379
Int. Cl.[4] B29D *30/24*
U.S. Cl. 156—415 **1 Claim**



1. An apparatus for building pneumatic tires, comprising:

a main tire-building drum;

guide members having said main tire-building drum mounted thereon;

supports mounted on said guide members;

auxiliary tire-building drums mounted for rotation on said supports coaxially with said main tire-building drum;

a rotation drive for said main tire-building drum;

actuators for collapsing and expanding said auxiliary tire-building drums;

drive means for axially moving said supports and said auxiliary tire-building drums mounted thereon;

a transmission shaft connected with said rotation drive of said main tire-building drum for rotation therewith;

intermediate shafts provided with gears and mounted on said supports of said auxiliary tire-building drums and connected to said transmission shaft for rotation therewith; and

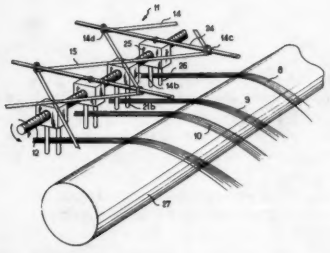
tooth rims provided on said auxiliary tire-building drums, said tooth rims being engageable with the gears of said intermediate shafts only when the auxiliary tire-building drums are in the collapsed position such that rotation is only transmitted to said auxiliary tire-building drums from said rotation drive for said main tire-building drum when the auxiliary tire-building drums are in the collapsed position.

4,878,984

APPARATUS FOR FORMING A FILAMENT-WOUND STRUCTURE ON A CYLINDRICAL POLE

Pierre Bourrieres, Cahors, France, assignor to Manufacture d'Appareillage Electrique de Cahors, Cahors, France

Division of Ser. No. 865,769, May 22, 1986, Pat. No. 4,769,967.
This application May 11, 1988, Ser. No. 195,678
Claims priority, application France, May 28, 1985, 85 07952
Int. Cl.[4] B31C *13/00*; B65H *81/00*
U.S. Cl. 156—431 **5 Claims**



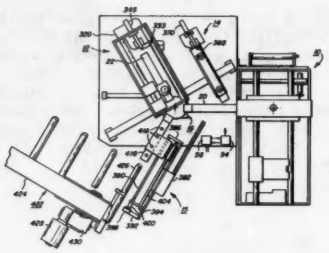
1. Apparatus for forming a filament-wound structure on a cylindrical pole (1) of plastic material having a longitudinal axis X—X', and having a bottom end to be fitted in the ground and a top end adapted to support loads, said pole being reinforced by said wound structure of filaments disposed in a plurality of layers, each filament having a winding angle (α) with respect to a plane perpendicular to said axis X—X' of the pole (1), the adjacent filaments in each layer being spaced a distance apart, the winding angle (α) of each filament and said distance between adjacent filaments progressively increasing from the bottom end to the top end of the pole, said apparatus comprising means for feeding a filament web impregnated with resin in the unpolymerized state to the pole (1) at a predetermined angle (α) with respect to a plane perpendicular to said axis, means for driving the pole (1) in rotation about said axis, means for displacing the filament web along the pole from the bottom end to the pole end thereof in a direction parallel to the axis of the pole while this latter is being driven in rotation, said feeding means feeding a plurality of parallel fiber slivers (7, 8, 9) simultaneously to the pole (1), and means (13, 14, 15, . . . 20) for progressively increasing the spacing between said slivers during feeding of said slivers from the bottom end toward the top end of the pole in each said layers, said increasing means comprising a rotatably mounted threaded rod (12) in cooperating relation with a series of deformable parallelograms (13, 14, 15, . . . 20) adapted to carry at two of their opposite vertices a body (14*a*, 14*b*) which is slidably mounted on said threaded rod, each body being provided with a fork (21*a*, 21*b*) for guiding the displacement of a fiber sliver (7, 9), the vertex of the deformable parallelogram (13) located at one end of the threaded rod (12) being rigidly coupled to a fixed point (22) whilst the vertex of the deformable parallelogram (20) adjacent the other end of the threaded rod (12) is rigidly fixed to a body (23) which is engaged by screwing on said threaded rod (12).

4,878,985

APPARATUS FOR PREPARING BELTS

Karl V. Thomsen, Ontario; John J. Darcy, Webster; Augustus W. Griswold, Rush; Boris W. Haritonoff, Geneseo, and Jacob Pond, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 28,807, Mar. 20, 1987, abandoned. This application May 31, 1988, Ser. No. 200,408
Int. Cl.[4] B29C *53/36;* B32B *31/16*
U.S. Cl. 156—459 17 Claims



1. Apparatus for fabricating belts comprising

(a) a web supply means for supplying a web having a leading edge from a web supply roll,

(b) web cutter means adapted to sever said web to form a web segment having a trailing edge, a midsection and said leading edge,

(c) an adjustable web pick up means adapted to temporarily grip said web and pull said leading edge a predetermined distance downstream from said web cutter means,

(d) a first invertable gripper means adjacent to said web cutter means, said first invertable gripper means being adapted to temporarily grip the lower surface of said trailing edge of said web,

(e) means to invert said first invertable gripper and loop said trailing edge of said web segment over said midsection of said web segment,

(f) a second invertable gripper means spaced downstream from said first invertable gripper means, said second invertable gripper means being adapted to temporarily grip the lower surface of said leading edge of said web,

(g) means to activate said web pick up means to transport said leading edge of said web upstream to a location adjacent to and above said second invertable gripper means,

(h) means to invert said second invertable gripper and loop said leading edge of said web segment over the midsection of said web segment whereby said leading edge forms a lap joint with said trailing edge and said midsection of said web segment forms the bottom of a loop loosely suspended from said lap joint,

(i) a belt welding station comprising means adapted to weld said lap joint,

(j) a belt conveying anvil comprising an elongated arm having a free end, a supported end and at least one opening extending along the upper surface of said elongated arm,

(k) means to form a partial vacuum within said opening,

(l) an anvil transporting means adapted to support said supported end of said anvil and adapted to position said upper surface of said elongated arm within said loop and below said lap joint of said web,

(m) means to activate said first invertable gripper and said second invertable gripper to transfer said web at said lap joint to said upper surface of said elongated arm of said anvil,

(n) means to activate said means to form a partial vacuum within said opening of said elongated arm of said anvil to secure said lap joint to said upper surface of said elongated arm of said anvil,

(m) means to convey said elongated arm and said loosely suspended loop to said belt welding station, and

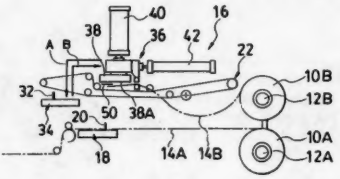
(o) means to activate said welding station to weld said lap joint while said lap joint is secured to said elongated arm of said anvil to form a welded belt.

4,878,986

WEB BUTT SPLICING DEVICE

Tetsuo Nishikawa, Haibara, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 14, 1988, Ser. No. 284,286
Claims priority, application Japan, Dec. 17, 1987, 62-319786
Int. Cl.[4] B65H *19/14, 19/18*
U.S. Cl. 156—504 8 Claims



1. A web butt splicing device for splicing a first roll of web to a second roll of web by butting the following end of the first roll of web against the leading end of the second roll of web using an adhesive tape, said device comprising:

a butt splicing table including a hold surface for attracting and positioning said first roll of web and a cutting device for cutting said following end of said first roll of web into a given shape;

a guide device for unwinding said leading end of said second roll of web from said second web roll and guiding the same;

a provisionally positioning table including a hold surface for attracting and holding a web, said table being adapted to hold on said hold surface said leading end of said second roll of web guided by said guide device; and,

a web carrying device including a hold surface for attracting, positioning and holding a web, said device being adapted to attract and remove said leading end of said second roll of web from said hold surface of said provisionally positioning table by means of said hold surface thereof and carry said leading end of said second roll of web to said butt splicing table so as to butt said leading end of said second roll of web against said following end of said first roll of web.

4,878,987

TRANSVERSE ZIPPER BAG MATERIAL AND METHOD OF AND MEANS FOR MAKING SAME

Donald L. Ven Erden, Wildwood, Ill., assignor to Minigrip, Inc., Orangeburg, N.Y.

Continuation of Ser. No. 26,011, Mar. 16, 1987, abandoned. This application Aug. 1, 1988, Ser. No. 226,544
Int. Cl.[4] B31B *1/90, 23/72;* B32B *31/10*
U.S. Cl. 156—519 4 Claims

1. A mechanism for making material suitable for use in a form, fill and seal operation comprising in combination:

means for advancing a continuous sheet of thin plastic film material along a path including a fastener station therealong;

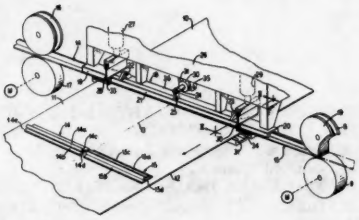
means for supplying a first supply of flexible fastener strip material at one side of the sheet;

means for supplying a second supply of flexible fastener strip material to the opposite side of the sheet;

first guide means positioned at said station aligned with said first supply for guiding the first strip material laterally onto the sheet;

second guide means positioned at said station aligned with said second supply of strip material for guiding the second strip material laterally onto said sheets positioned in alignment with said first supply of first strip material;

means for securing said first and second strips to the film sheet;



said first and second guide means includes open channels facing downwardly toward the film through which the flexible strip material slides; and

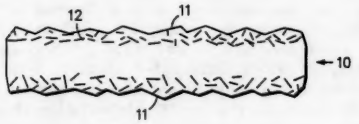
including a movable wall along the forward side of the channels movable to a noninterfering position to allow exit of the fastener strip material from the channels when the film sheet is moved forwardly along the path after the strip material has been attached thereto.

4,878,988

GETTERING PROCESS FOR SEMICONDUCTOR WAFERS

James B. Hall; Martin G. Robinson, both of Chandler, and Ronald C. Swift, Mesa, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 3, 1988, Ser. No. 251,734
Int. Cl.[4] G30B *33/00*
U.S. Cl. 156—600 **5 Claims**



4. A method for removing impurities from a wafer having a first and second surface consisting essentially of:

slicing the wafer from an ingot thus creating mechanical damage on the first and second wafer surfaces;

heating the wafer at a temperature for a amount of time so that impurities are gettered to the damaged area; and

lapping the damaged area thus removing the gettered impurities.

4,878,989

CHEMICAL BEAM EPITAXY SYSTEM

Andrew J. Purdes, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 26, 1986, Ser. No. 935,481
Int. Cl.[4] C23C *16/00*
U.S. Cl. 156—613 **12 Claims**

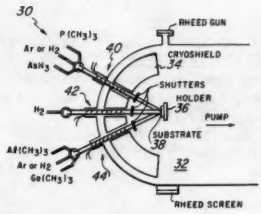
1. A chemical beam epitaxy system, comprising:

(a) a vacuum chamber;

(b) a substrate holder within said chamber;

(c) a plurality of cells in said chamber, each of said cells providing a beam directed at a substrate in said substrate holder, each of said beams essentially consisting of atoms or molecules selected from the group consisting of atomic hydrogen, compounds of elements which are constituents of material to be epitaxially grown on said substrate, elements which are constituents of material to be epitaxially grown on said substrate, and diluents, with at least one of said cells with a beam including atomic hydrogen.

7. A method of epitaxial growth of compound materials on a substrate, comprising the steps of:



(a) directing a first beam including a first compound of a first element at a surface of a substrate in an evacuated chamber, said first compound containing carbon;

(b) directing a second beam including a second compound of a second element at said surface in said chamber concurrently with said first beam, said first and second elements constituents of a compound material; and

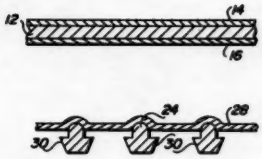
(c) directing a third beam including atomic hydrogen at said surface in said chamber concurrently with said first and second beams.

4,878,990

ELECTROFORMED AND CHEMICAL MILLED BUMPED TAPE PROCESS

William P. Dugan, Glendora; Rama P. Samudrala, Upland, and Grace A. Rivas, Claremont, all of Calif., assignors to General Dynamics Corp., Pomona Division, Pomona, Calif.

Filed May 23, 1988, Ser. No. 197,794
Int. Cl.[4] C23F *1/02*; B44C *1/22*; C03C *15/00, 25/06*
U.S. Cl. 156—630 **12 Claims**



1. A process for producing bumped lead frae tape comprising the preliminary steps of:

(a) laminating a metal foil sheet on a first side and a second side with a photoresist;

(b) simultaneously exposing said first side to an image of bumps and said second side to an image of leads;

(c) developing said image of bumps to expose a plurality of bump openings while protecting said photoresist on said second side from being developed;

(d) cleaning those parts of said metal foil sheet exposed in said bump openings; and

(e) electroforming metal bumps on said metal sheet in said bump openings to a predetermined height.

2. The process of claim 1 further including the subsequent steps of:

(f) developing said lead image on said second side of said sheet;

(g) chemically milling exposed parts of said metal sheet on said second side with an etchant while protecting said first side from contact with said etchant, for a time sufficient to form a plurality of bumped leads;

(h) removing any remaining said photoresist from said first and second sides to leave a bumped tape; and

(i) activating said bumped tape with a solution of sodium persulfate.

4,878,991

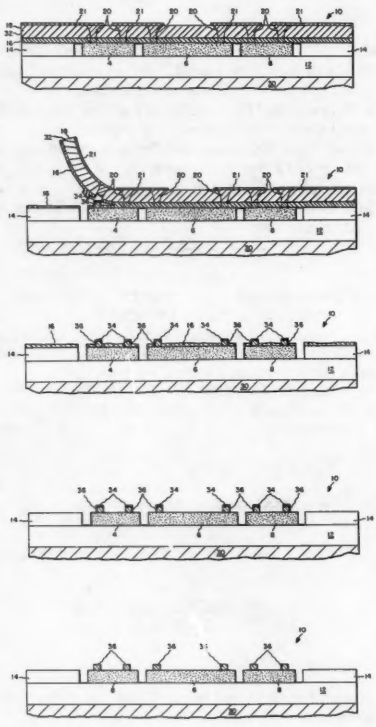
SIMPLIFIED METHOD FOR REPAIR OF HIGH DENSITY INTERCONNECT CIRCUITS

Charles W. Eichelberger, Schenectady, and Robert J. Wojnarowski, Ballston Lake, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 12, 1988, Ser. No. 283,095

Int. Cl.[4] **C23F** *1/02;* **B44C** *1/22;* **C03C** *15/00;* **B29C** *37/00*

U.S. Cl. 156—630 **19 Claims**



1. A method of gaining access to, for the purpose of replacing, a defective integrated circuit chip situated in a high density interconnect circuit wherein a polymer overlay layer is bonded by an adhesive to the upper surfaces of integrated circuit chips positioned on a substrate, comprising the steps of:

peeling said polymer overlay layer from said integrated circuit chips;

removing any adhesive remaining on said integrated circuit chips;

applying an etchant to metal deposits on contact pads situated on said integrated circuit chips so as to remove said deposits; and

washing particulate from said integrated circuit chips and said substrate.

4,878,992

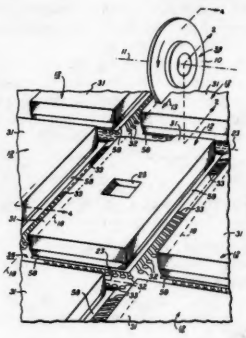
METHOD OF FABRICATING THERMAL INK JET PRINTHEADS

Michael R. Campanelli, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 25, 1988, Ser. No. 276,845

Int. Cl.[4] **H01L** *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—633 **8 Claims**



1. A method of fabricating a plurality of ink jet printheads from at least two substrates having confronting surfaces aligned and bonded together, wherein the confronting surface of one substrate contains a plurality of sets of equally spaced, linear arrays of heating elements and addressing electrodes having terminals for enabling the individual addressing of each heating element with current pulses, and wherein the confronting surface of the other substrate contains a plurality of sets of equally spaced, parallel grooves and a recess, one end of each set of grooves communicate with an ink supply means, the fabricating method comprising the steps of:

(a) removing the substrate material above the electrode terminals on the other substrate and thus producing a plurality of separate portions in which each contain one set of grooves and interconnected recesses;

(b) dicing the end portions from each separate substrate portion containing the ends of the set of grooves opposite the ends communicating with the ink supply means to form a nozzle face containing open groove ends, the open groove ends to serve subsequently as droplet emitting nozzles, the dicing being accomplished by a first circular, resin-bonded blade having a predetermined diamond particle size and density, the blade having a predetermined diameter and thickness, and operated at a speed of greater than 32,000 inches per second with a predetermined depth of cut, so that the entire region containing grooves are cut; and

(c) dicing in a direction perpendicular to the nozzle faces to separate the rows of printheads into individual printheads.

4,878,993

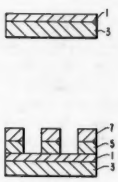
METHOD OF ETCHING THIN INDIUM TIN OXIDE FILMS

Barbara A. Rossi, Putnam Valley, and Udayanath Mitra, Tarrytown, both of N.Y., assignors to North American Philips Corporation, New York, N.Y.

Filed Dec. 22, 1988, Ser. No. 289,654

Int. Cl.[4] B44C *1/22*; C03C *15/00, 25/06*; C23F *1/02*

U.S. Cl. 156—643 **19 Claims**



1. A method of etching a thin layer of indium tin oxide deposited on a substrate comprising subjecting said layer of indium tin oxide to ion reactive etching in a plasma consisting of disassociated argon.

4,878,994

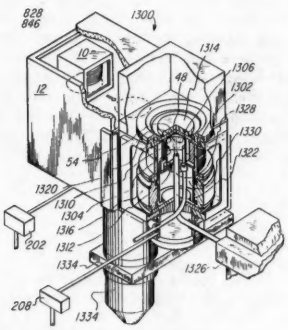
METHOD FOR ETCHING TITANIUM NITRIDE LOCAL INTERCONNECTS

Rhett B. Jucha, Celeste; Cecil J. Davis, Greenville; Tom Tang, Dallas, and Lee M. Loewenstein, Plano, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 74,415, Jul. 16, 1987. This application Mar. 29, 1988, Ser. No. 174,649

Int. Cl.[4] C23F *1/02*; B44C *1/22*; C03C *15/00*; H01L *21/306*

U.S. Cl. 156—643 **53 Claims**



1. A process for etching of a titanium containing film in a process chamber comprising the steps of:

(a) generating at least free radicals from at least a halogen containing gas in remote plasma generator separated from the process chamber;

(b) introducing said free radicals to said process chamber; and

(c) generating an in situ plasma within the process chamber from said free radicals.

4,878,995

METHOD OF DRY ETCHING AND APPARATUS FOR USE IN SUCH METHOD

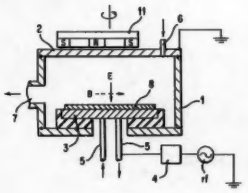
Tsunetoshi Arikado, Tokyo; Makoto Sekine, Kanagawa; Haruo Okano, and Yasuhiro Horiike, both of Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Jul. 1, 1988, Ser. No. 214,368

Claims priority, application Japan, Jul. 2, 1987, 62-165860

Int. Cl.[4] H01L *21/306*; B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—643 **34 Claims**



1. A method of dry etching, comprising the steps of:

disposing an object to be etched in a vacuum chamber, the object having a first film thereon and a second film over the first film;

introducing an activated reactive gas into the chamber for selectively etching the second film; and

cooling the object to a temperature at which a thin film including at least an element of the first film deposits on the first film selectively.

4,878,996

METHOD FOR REDUCTION OF FILAMENTS BETWEEN ELECTRODES

Allan T. Mitchell, Garland; Howard L. Tigelaar, Allen; Shaym G. Garg, Lubbock, and Kalipatnam V. Rao, Plano, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 170,528, Mar. 21, 1988, Pat. No. 4,806,201, which is a continuation of Ser. No. 937,658, Dec. 4, 1986, Pat. No. 4,749,443. This application Jan. 23, 1989, Ser. No. 300,468

Int. Cl.[4] H01L *21/306*; B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—653 **11 Claims**

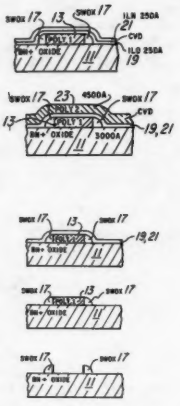
1. A method for fabricating an integrated circuit at a surface of a semiconductor body, comprising:

forming a first polysilicon electrode layer over selected portions of said surface;

forming an interlevel dielectric layer over said first electrode layer, said interlevel dielectric layer comprising a material which inhibits oxidation of silicon and extending over an edge of said first polysilicon electrode layer;

forming a second electrode layer over said dielectric layer and overlying a portion of said first polysilicon electrode layer;

removing said interlevel dielectric layer over an undesired portion of said first polysilicon electrode layer; and



removing said undesired portion of said first polysilicon electrode layer.

4,878,997

METHOD AND APPARATUS FOR MANUFACTURING FIBRE PULP

Rolf B. Reinhall, Bellevue, Wash., assignor to Sunds Defibrator Aktiebolag, Sundsvall, Sweden

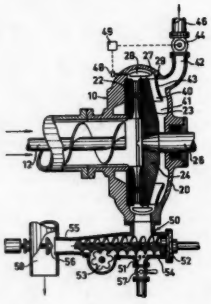
PCT No. PCT/SE84/00053, § 371 Date Oct. 2, 1984, § 102(e) Date Oct. 2, 1984, PCT Pub. No. WO84/03313, PCT Pub. Date Aug. 30, 1984

PCT Filed Feb. 14, 1984, Ser. No. 666,629

Claims priority, application Sweden, Feb. 22, 1983, 8300961

Int. Cl.[4] D21B *1/12*

U.S. Cl. 162—23 **12 Claims**



1. A method of manufacturing fibre pulp from lignocellulose-containing material in a refiner provided with at least two opposed refining members rotatable relative to each other and enclosed is a pressure-proof refiner housing, so as to permit the material to be disintegrated during passsage of the material outwardly through a gap defined between the refining members and discharged from the refiner housing, including the steps of:

(a) providing steam in the pulp during the manufacturing;

(b) rotating at least one of the refining members so as to generate centrifugal forces;

(c) passing the pulp and the steam through the gap;

(d) separating the steam from the pulp by the centrifugal forces;

(e) discharging the steam from the refiner housing under pressure; and

(f) discharging the pulp from the refiner housing under pressure.

4,878,998

METHOD FOR CONTROLLING PEROXIDE BLEACHING IN A PLURALITY OF BLEACHING STAGES

Jan-Erik Höök, Lilla Edet, and Görgen Akerlund, Sollentuna, both of Sweden, assignors to Eka Nobel AB, Surte, Sweden

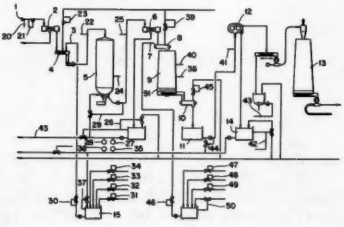
PCT No. PCT/SE87/00467, § 371 Date Jun. 20, 1988, § 102(e) Date Jun. 20, 1988, PCT Pub. No. WO88/02796, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 14, 1987, Ser. No. 210,281

Claims priority, application Sweden, Oct. 20, 1986, 8604459

Int. Cl.[4] D21C *9/16*

U.S. Cl. 162—49 **21 Claims**



1. A method for controlling peroxide bleaching of mechanical, thermomechanical and chemi-mechanical pulp in a plurality of bleaching stages, comprising the steps of bleaching the pulp in a first stage with a predetermined amount of bleaching chemicals containing peroxide and under predetermined reaction conditions, measuring the brightness of the pulp from this first stage and calculating the bleachability of the pulp as a function of the measured brightness and the predetermined amount of chemicals and predetermined reaction conditions feedforwardly adjusting the amount of bleaching chemicals containing peroxide added in a second stage as a function of the calculated bleachability of the pulp from the first stage, and bleaching the pulp in the second stage.

4,878,999

NON-ALUM SIZING

John W. Gowan, Jr., Washington, D.C., assignor to Westvaco Corporation, New York, N.Y.

Filed Sep. 19, 1988, Ser. No. 246,589

Int. Cl.[4] D21H *3/34*

U.S. Cl. 162—164.6 **7 Claims**

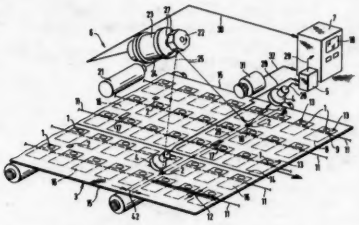
1. A process for the nonreactive sizing of cellulose fibers in the substantial absence of alum comprising adding to an aqueous furnish of cellulose fibers at approximately neutral pH conditions a sizing composition comprising cationic material consisting essentially of a cationic polymer characterized by a molecular weight of at least 15,000 and having at least 5% of the monomer units in said polymer exhibiting a positive charge, a cationic starch, and saponified fortified rosin.

4,879,000

PROCESS FOR DETERMINING DIMENSION ERRORS

Alexander Gausa, Bielefeld, Fed. Rep. of Germany, assignor to Feldmuehle Aktiengesellschaft, Duesseldorf, Fed. Rep. of Germany

Filed Apr. 6, 1988, Ser. No. 178,140
Claims priority, application Fed. Rep. of Germany, Apr. 18, 1987, 3713279
Int. Cl.[4] D21F *11/00*
U.S. Cl. 162—198 9 Claims



1. A method of determining a dimension or a distortion error in a paper sheet comprising:

(a) making a paper sheet including a security thread by a paper making process;

(b) forming a water mark within a defined area of the paper sheet during the paper making process;

(c) forming at least two sharp-edged recesses into the body of the paper sheet during the paper making process in an intermediate area outside said defined area, the depth of said recesses being 40 to 80% of the thickness of the paper sheet, said recesses being disposed in positions opposite to each other and each recess having a selected x and y position in the paper sheet;

(d) scanning the paper sheet with a light means so that light strikes the recesses and is reflected as light pulses or permeates the paper sheet;

(e) detecting the light pulses after the recesses are struck and evaluating the pulses in a computer means to establish a value of the pulses; and

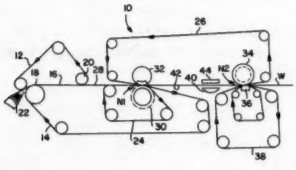
(f) comparing the value of the light pulses to values of the x and y positions of the recesses in said computer means, thereby determining any distortion in the paper sheet.

4,879,001

TWIN WIRE FORMER WITH ROLL PRESS FOLLOWED BY EXTENDED NIP PRESS

Dennis C. Cronin, Rockton, Ill., assignor to Beloit Corporation, Beloit, Wis.

Filed Sep. 12, 1988, Ser. No. 245,481
Int. Cl.[4] D21F *9/00, 3/02*
U.S. Cl. 162—206 14 Claims



1. A apparatus for making a paper web from stock, said apparatus having a direction of web travel and comprising:

first and second forming wire loops cooperating together to define therebetween a substantially horizontal web forming section having a first and a second end;

a headbox disposed adjacent to said first end of said forming section for ejecting the stock between said wires such that the web is formed in the direction of web travel from the stock during passage of the stock from said first towards said second end of said forming section;

a first felt disposed downstream in the direction of web travel relative to said forming section, said first felt running contiguously relative to said second wire in the second wire loop such that said second wire is disposed between said first felt and the web;

a second felt disposed downstream in the direction of web travel relative to said forming section and on the opposite side of the web relative to said first felt;

an open roll looped by said first felt;

a suction roll looped by said second felt and cooperating with said open roll for defining therebetween a first press nip for pressing a first portion of water from the formed web;

a backing roll disposed downstream in the direction of web travel relative to said first nip; and

an extended nip press shoe cooperating with said backing roll for defining therebetween an extended nip such that said second felt and the web extend through said extended nip for removing a second portion of water from the web.

14. A method for making a paper web from stock, said method comprising the steps of:

ejecting the stock from a headbox between a first and a second forming wire which cooperate together to define therebetween a substantially horizontal web forming section having a first and a second end;

forming the web during passage of the stock from the first to the second end of the forming section;

supporting the formed web on the second wire and guiding the formed web on the second wire through a first press nip defined by an open roll and a cooperating suction roll, the first press nip being disposed downstream relative to the forming section;

guiding a first felt disposed downstream relative to the forming section through said first press nip, the first felt running contiguously relative to the second wire such that the second wire is disposed between the first felt and the web and such that said first felt loops the open roll;

transferring the pressed web to a second felt which extends through the first press nip and which loops around the suction roll;

applying steam to the press web downstream relative to the first press nip for heating the web; and

further pressing the pressed web by guiding the pressed, heated web and said second felt through an extended nip press.

4,879,002

FRAME CONSTRUCTION OF THE PRESS SECTION IN A PAPER MACHINE

Yrjö Snellman, Tampere, and Mauri Rantala, Nokia, both of Finland, assignors to Oy Tampella Ab, Tampere, Finland

Filed Sep. 15, 1988, Ser. No. 244,883
Claims priority, application Finland, Sep. 15, 1987, 874003
Int. Cl.[4] D21F *3/00*
U.S. Cl. 162—273 4 Claims

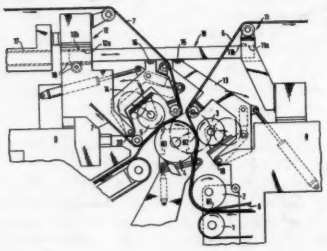
1. A frame construction in a press section in a paper machine having a longitudinal direction, the press section including a combination of at least two rolls forming at least one press nip, members for guiding the paper web through the press section and members for guiding at least one felt into contact with the press section, said frame construction comprising:

a front frame situated before said roll combination, a rear frame situated after said roll combination and a horizontal intermediate frame interconnecting said front and rear frames above the press section, said intermediate frame comprising at least one substantially horizontal beam

extending in the longitudinal direction of the papermaking machine and being located on a level;

means for detachably interconnecting said intermediate frame to said front frame and rear frame whereby said intermediate frame is easily removable from above the roll combination;

transfer means for moving said intermediate frame horizontally and in the longitudinal direction of the papermaking machine in a removal direction between a working position in which said intermediate frame is interconnected



above said roll combination to a service position in which said intermediate frame is detached from both front and rear frames by said means for detachably interconnecting same and removed from above said roll combination, thereby providing for an easy access thereto; and

a support means provided on the frame construction in the removal direction and located at substantially the same level as said intermediate frame for receiving and supporting said intermediate frame in said service position. intermediate frame.

4,879,003

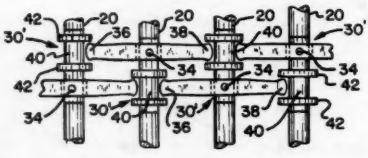
SLICE LIP PROTECTOR SYSTEM

Gordon K. Reed, Bexley, Ohio, assignor to Process Automation Business, Inc., Columbus, Ohio

Filed Apr. 7, 1989, Ser. No. 334,497

Int. Cl.[4] D21F *1/06*

U.S. Cl. 162—344 **6 Claims**



1. In a paper machine headbox slice lip protector system permitting limited incremental slice lip actuator movement through a series of adjacent slice profiling spindles having mechanically interconnected protectors mounted thereon, the improvement comprising:

said interconnected protectors each including an elongated lever member centrally pivoted on one of said spindles;

lock bolts on the opposite ends of said lever member;

stop means mounted on the spindles;

said stop means defining a keeper recess into which said lock bolts of adjacent protectors extend to form a mechanical interconnection;

whereby the one spindle is permitted to move up or down within limits established by the adjacent keeper recesses as the lever member pivots.

4,879,004

PROCESS FOR THE EXTRACTION OF OIL OR POLYCHLORINATED BIPHENYL FROM ELECTRICAL PARTS THROUGH THE USE OF SOLVENTS AND FOR DISTILLATION OF THE SOLVENTS

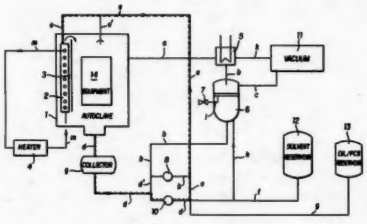
Gustav Oesch, Zurich; Paul Gmeiner, Lieli, and Urs Hofer, Zurich, all of Switzerland, assignors to Micafil AG, Zurich, Switzerland

Filed May 4, 1988, Ser. No. 190,080

Claims priority, application Switzerland, May 7, 1987, 01740/87

Int. Cl.[4] B01D *1/22, 3/10, 11/00*

U.S. Cl. 203—89 **8 Claims**



1. A combined process for the extraction of oil or polychlorinated biphenyl from parts having electrical insulation impregnated with a dielectric liquid containing oil or polychlorinated biphenyl, by means of a highly volatile solvent, and for the distillation of the solvent from a mixture of oil or polychlorinated biphenyl with the solvent, comprising the steps of:

locating parts to be cleaned in an evacuated autoclave;

introducing a highly volatile solvent into said autoclave;

evaporating the highly volatile solvent during a heating phase in at least one evaporator located in the autoclave;

condensing the solvent on said parts thereby heating said parts so that said solvent penetrates into the electrical insulation of the parts and so that the condensation heat of the solvent dissolves the oil or the polychlorinated biphenyl out from said electrical insulation; and

effecting a plurality of intermediate pressure reductions during the heating phase such that during each intermediate pressure reduction, the supply of the solvent is discontinued and the mixture is circulated in order to simultaneously carry out a distillation phase so that the highly volatile solvent is distilled out of the oil or polychlorinated biphenyl-solvent mixture directly from the autoclave, wherein the pressure after each intermediate pressure reduction is reduced to between 1 to 100 mbar.

4,879,005

ELECTROCHEMICAL SENSOR FOR HYDROGEN SENSING

Derek J. Fray, Cambridge, England, and David R. Morris, New Brunswick, Canada, assignors to National Research Development Corporation, London, England

Filed Sep. 22, 1988, Ser. No. 247,567

Claims priority, application United Kingdom, Oct. 2, 1987, 8723222

Int. Cl.[4] G01N *27/58*

U.S. Cl. 204—1 T **13 Claims**

1. An electrochemical sensor for hydrogen, comprising

(i) an electronically conductive component exposable to the hydrogen to be sensed and which catalyses the disassociation of hydrogen to hydrogen ions,

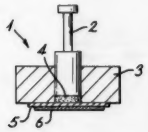
(ii) a solid-state electrolyte for hydrogen cations in contact with the component (i), and

(iii) a reference entity in contact with the electrolyte (ii) and connectable to one side of a voltmeter whose other side is connectable to the component (i),

said reference entity (iii) comprising a solid mixture of two oxidation states of the same element.

13. A method of sensing the presence or measuring the concentration of hydrogen, comprising:

providing an electrochemical sensor for hydrogen comprising (i) an electronically conductive component exposable



to the hydrogen to be sensed and which catalyses the disassociation of hydrogen to hydrogen ions, (ii) a solid-state electrolyte for hydrogen cations in contact with the component (i), and (iii) a reference entity in contact with the electrolyte (ii) and connectable to one side of a voltmeter whose other side is connectable to the component (i), the reference entity (iii) comprising a solid mixture of two oxidation states of the same element;

exposing the electronically conductive component (i) of said sensor to the hydrogen to be sensed; and

measuring the voltage generated between the electronically conductive component (i) and the reference entity (iii).

4,879,006

LIQUID TREATMENT PROCESS

Andrew D. Turner, Abingdon, United Kingdom, assignor to United Kingdom Atomic Energy Authority, Oxfordshire, England

Filed Aug. 5, 1988, Ser. No. 228,510

Claims priority, application United Kingdom, Aug. 12, 1987, 8719045

Int. Cl.[4] C25C *1/22, 3/34;* C25D *3/54, 5/32*

U.S. Cl. 204—1.5 **6 Claims**

1. A method of converting dissolved ruthenium present in aqueous solution in a first oxidisable oxidation state to ruthenium (IV) oxide, which method comprises establishing an electrochemical cell wherein the solution is the cell electrolyte, and subjecting the ruthenium in the solution in said cell to electrochemical oxidation and to electrochemical reduction thereby to convert the ruthenium to the +4 oxidation state and give rise to the ruthenium (IV) oxide.

4,879,007

SHIELD FOR PLATING BATH

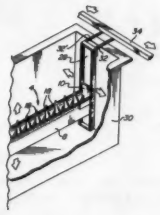
Chi W. Wong, Kowloon, Hong Kong, assignor to Process Automation Int'l Ltd., Kowloon, Hong Kong

Filed Dec. 12, 1988, Ser. No. 282,751

Int. Cl.[4] C25D *5/02, 17/06*

U.S. Cl. 204—15 **17 Claims**

1. In a method for the electrolytic deposition of a coating of metal having uniform thickness on an electroplatable substrate as cathode in an electrolyte bath equipped with anode, the improvement comprising supporting said substrate in a substantial vertical plane in an elongated trough, said trough being slidably mounted at each end in guide members and adapted for confined movement in a vertical plane in said electrolytic



bath, wherein the lower edge of said substrate is located below the plane in which lies the upper edges of said trough.

4,879,008

PREPARATION OF BIDENTATE LIGANDS

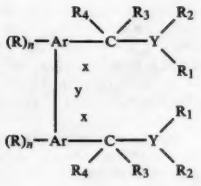
Thomas A. Puckette, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 9, 1987, Ser. No. 118,573

Int. Cl.[4] C25C *3/00*

U.S. Cl. 204—72 **8 Claims**

1. A process for preparing a bidentate ligand of the formula



wherein

each Ar is independently selected from aromatic ring compounds having 6 up to 14 carbon atoms;

the x bonds and the y bonds are attached to adjacent carbon atoms on the ring structures;

each R, when present as a substituent, is independently selected from alkyl, alkoxy, aryloxy, aryl, aralkyl, alkaryl, alkoxyalkyl, cycloaliphatic, halogen, alkanoyl, alkanoyloxy, alkoxycarbonyl, carboxyl, cyano or formyl radicals;

n is a whole number in the range of 0–4 where Ar is phenyl; 0–6 where Ar is naphthyl; and 0–8 where Ar is phenanthryl or anthracenyl;

each R_1 and R_2 is independently selected from alkyl, aryl, aralkyl, alkaryl or cycloaliphatic radicals or substituted derivatives thereof; wherein substituted derivatives are selected from ethers, amines, amides, sulfonic acids, esters, hydroxyl groups or alkoxy groups;

each R_3 and R_4 is independently selected from hydrogen and the R_1 substituents;

each of the above alkyl groups or moieties is a straight or branched chain of 1–20 carbons;

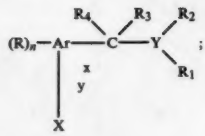
each aryl group contains 6–10 ring carbons;

each cycloaliphatic group contains from 4–8 ring carbons; and

each Y is independently selected from the elements N, P, As, Sb and Bi;

said process comprising, maintaining a redox reaction system comprising

(a) a reactant of the formula:



wherein X is a halogen,

(b) a polar, aprotic solvent,

(c) a nickel compound, and

(d) a reducing agent, which has a sufficient reducing potential to promote the reduction of Ni(II) to Ni(O), at a temperature and for a time sufficient to form said ligand.

4,879,009

METHOD OF PREPARING AN ASBESTOS DIAPHRAGM

Jerry N. Kinney, Mogadore, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 26,810, Mar. 1, 1987, Pat. No. 4,806,214, which is a continuation of Ser. No. 813,326, Dec. 24, 1985, abandoned. This application Sep. 2, 1988, Ser. No. 240,777

The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.

Int. Cl.[4] C25G *1/14*

U.S. Cl. 204—98 **9 Claims**

1. A method of depositing a liquid permeable asbestos diaphragm on a foraminous cathode structure by the steps of:

(a) providing an aqueous slurry containing from about 100 to about 200 grams per liter alkali metal hydroxide and from about 0.5 to about 3 weight percent, basis total weight of slurry, of asbestos and particulate alternating copolymer of ethylene and chlorotrifluoro-ethylene, the copolymer being present in amount of from about 1 to about 30 weight percent basis total weight of asbestos and copolymer;

(b) contacting a foraminous cathode structure with the slurry so as to deposit on the foraminous cathode structure a mat containing alkali metal hydroxide, asbestos and copolymer; and

(c) heating the foraminous cathode structure having the mat deposited thereon at temperature in the range of from about 140° C. to about 220° C. for at least two hours so as to react the alkali metal hydroxide with the asbestos, the heating temperature being below the melting point of the copolymer.

4,879,010

RECOVERY OF MERCURY FROM MERCURY COMPOUNDS VIA ELECTROLYTIC METHODS

Mark W. Grossman, Belmont, and William A. George, Rockport, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Continuation of Ser. No. 815,150, Dec. 31, 1985, abandoned. This application Oct. 7, 1988, Ser. No. 259,425

Int. Cl.[4] C25C *1/16*

U.S. Cl. 204—105 R **10 Claims**

1. A process for the production of isotopically specific elemental mercury from a compound comprising:

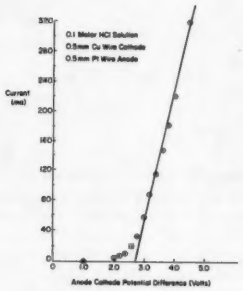
a. producing an isotopically specific mercury compound in a reactor for producing such a mercury compound;

b. dissociating said mercury compound into ions which are soluble in an electrolyte solution, said electrolyte solution contained in said reactor, thereby producing isotopically specific mercury ions within said electrolyte solution;

c. transporting said electrolyte solution containing the isotopically specific mercury ions to an electrolytic cell by means of a fluid connecting means connected to the reactor and the electrolytic cell, said electrolytic cell containing an anode and a cathode;

d. applying an electric voltage across said anode and cathode, thus passing an electric current from the anode through said electrolyte solution to the cathode wherein the isotopically specific mercury ions in the electrolyte solution are reduced and isotopically specific elemental mercury is plated onto the cathode and thereafter recovering said elemental mercury; and

e. transporting the electrolyte solution back to the reactor through fluid connecting means, such that additional isotopically specific mercury compound can be dissociated and transported to the electrolytic cell wherein additional elemental isotopically specific mercury can be recovered.



2. A process of claim 1, wherein Hg_2Cl_2 containing isotopically specific Hg is produced in the reactor and mercurous ions are formed in the electrolyte solution and reduced in the electrolytic cell to form elemental mercury.

7. A process as recited in claim 1, wherein HgO containing isotopically specific Hg is produced in the reactor and is dissociated in the electrolyte solution to produce isotopically specific mercuric ions in solution, said ions being reduced in the electrolytic cell to form isotopically specific elemental mercury.

4,879,011

PROCESS FOR CONTROLLING A REACTION BY ULTRASONIC STANDING WAVE

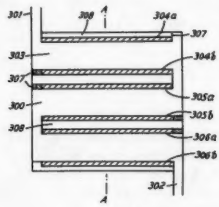
Cornelius J. Schram, Pavenham, England, assignor to National Research Development Corporation, London, England

Filed Aug. 8, 1988, Ser. No. 229,495

Claims priority, application United Kingdom, Aug. 7, 1987, 8718756

Int. Cl.[4] B01J *19/08*

U.S. Cl. 204—157.42 **19 Claims**



1. A process for controlling a reaction involving particulate material, in which said material is immersed in a fluid medium, an ultrasonic standing wave is established within said medium, said standing wave retaining said particulate material suspended in the medium, and a relative displacement is produced

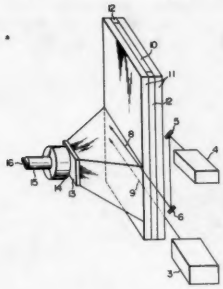
between said material and the fluid medium, whereby to effect or control the reaction.

4,879,012

METHOD FOR REUTILIZATION OF ELECTROPHORESIS GEL

Hideki Kambara, Hachioji, and Tetsuo Nishikawa, Koganei, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 24, 1988, Ser. No. 211,284
Claims priority, application Japan, Jun. 24, 1987, 62-155447
Int. Cl.[4] G01N *27/26*
U.S. Cl. 204—157.15 7 Claims



1. A method for reutilizing an electrophoresis gel which comprises irradiating an electrophoresis gel used for electrophoresis separation of a fluorophore-labeled sample and detection of the fluorescene emitted from the sample separated by electrophoresis with light, thereby photo-dissociating the fluorophore remaining in the gel and utilizing the irradiated gel; the fluorophore having a dissociation cross-section of 10^{-22} to 10^{-19} cm^2 and being FITC and said electrophoresis gel being irradiated with an argon laser with 40 mW or more, focused onto an area of 1 mm^2 as the light and the electrophoresis gel being scanned with said argon laser, thereby dissociating the fluorophore.

4,879,013

METHOD OF CATIONIC ELECTRODEPOSITION USING DISSOLUTION RESISTANT ANODES

Henry T. Austin, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 835,148, Mar. 3, 1986, abandoned. This application Jul. 19, 1988, Ser. No. 220,416
Int. Cl.[4] C25D *13/00*; C25B *11/04*
U.S. Cl. 204—180.2 4 Claims

1. A method of electrocoating an electrically conductive surface serving as a cathode in an electrical circuit comprising said cathode and an anode immersed in an aqueous dispersion of a cationic resinous composition which will dissolve stainless steel anodes comprising passing electric current between said cathode and anode at a constant voltage of from 50 to 500 volts and at a current density of from 0.5 to 10 amperes per square foot to cause a coating to deposit on the cathode, characterized in that the anode does not dissolve nor deteriorate during the electrocoating process and comprises a titanium including alloys of titanium substrate to which is adhered a coating of a conductive material selected from the group consisting of ruthenium oxide, iridium oxide and mixtures of.

4,879,014

REMOVAL OF ORGANIC ACIDS FROM FRESHLY PRODUCED BITUMEN

Hermanus G. van Laar; Richard H. Lea, both of Calgary, and Beverley Payne, Corunna, all of Canada, assignors to Shell Oil Company, Houston, Tex.

Filed Sep. 15, 1988, Ser. No. 244,885
Claims priority, application Canada, Sep. 18, 1987, 547250
Int. Cl.[4] B03C *5/00*
U.S. Cl. 204—190 12 Claims

1. A process for removal of organic acids from freshly produced bitumen comprising the following steps:

(a) freshly produced, acidic bitumen is diluted with a low-density hydrocarbon blend to create a favorable density difference with an aqueous phase,

(b) a dilute solution of caustic soda in water is intimately mixed with the diluted bitumen, allowing caustic soda to react with the acids in the bitumen,

(c) at least one demulsifying chemical is added to weaken the interfacial layers between the de-acidized bitumen phase and the organic salt containing aqueous phase,

(d) coalescence between the weakened droplets of the dispersed aqueous phase is achieved in an electrostatic dehydration vessel whereby separation between the bitumen and aqueous phase is effected in the vessel, and

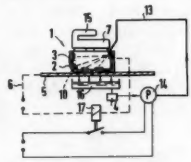
(e) the acid-reduced bitumen is removed from the top of the electrostatic coalescer vessel and the aqueous organic salt solution from its bottom.

4,879,015

METHOD AND MANUAL APPARATUS FOR THE SEMIMECHANICAL GALVANIZING OF SHEET METAL SURFACES

Jan Adamek, Rutesheim; Karl-Heinz Schaich, Kornwestheim, and Wolfgang Heck, Renningen, all of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.f. Porsche Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 836,368, Mar. 5, 1986, abandoned. This application Sep. 17, 1987, Ser. No. 97,716
Claims priority, application Fed. Rep. of Germany, Mar. 6, 1985, 3507927
Int. Cl.[4] C25D *5/06*
U.S. Cl. 204—224 R 4 Claims



1. An apparatus for electrolytically treating a surface of a workpiece comprising:

a treatment element having a bottom surface to engage the surface of the workpiece, the treatment element having a plurality of holes therethrough;

an absorbent cover positioned over at least the bottom surface of the treatment element;

connector means for connecting the treatment element to a source of electric current so that the treatment element serves as an anode during use;

a handle assembly for displacing the apparatus over the workpiece as a unit;

means to connect the handle assembly for the treatment element; and

drive means in the handle element for imparting an automatic oscillating movement to the treatment element with respect to the handle assembly.

wherein the holes in the treatment element terminate in a

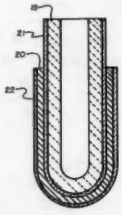
plurality of longitudinal and transverse grooves in the bottom surface of the treatment element, the grooves being open in the direction of the absorbent cover, the grooves serving to feed electrolyte to the absorbent cover and being connected with a feed line for the electrolyte and having a bottom side matched to the course of the shape of the surface of the workpiece.

4,879,016

ELECTROLYTE ASSEMBLY FOR OXYGEN GENERATING DEVICE AND ELECTRODES THEREFOR

Ashok V. Joshi, Salt Lake City, Utah, assignor to Ceramatec, Inc., Salt Lake City, Utah

Continuation-in-part of Ser. No. 889,214, Jul. 25, 1986, Pat. No. 4,725,346. This application Feb. 16, 1988, Ser. No. 156,549
The portion of the term of this patent subsequent to Feb. 16, 2005, has been disclaimed.
Int. Cl.[4] C25B *1/02, 9/00*
U.S. Cl. 204—242 **8 Claims**



1. In a ceramic electrolyte having oxygen transport characteristics suitably sized to provide useful oxygen quantities and a substantially non-porous silver electrode for conducting electrons and oxygen molecules and/or ions to said electrolyte surface or surfaces, the improvement comprising:

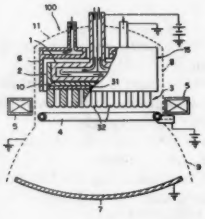
an electrode undercoat comprising a ceramic oxide electronic conductor adherent to said electrolyte surface.

4,879,017

MULTI-ROD TYPE MAGNETRON SPUTTERING APPARATUS

Hee-Yong Lee, Kyungki, Rep. of Korea, assignor to Dae Ryung Vacumm Co. Ltd., Seoul, Rep. of Korea

Filed Nov. 29, 1988, Ser. No. 279,200
Int. Cl.[4] C23C *14/34*
U.S. Cl. 204—298 **4 Claims**



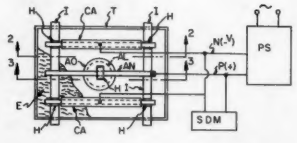
1. Apparatus for coating a substrate by magnetron sputtering comprising electromagnets for producing and directing transverse magnetic fields towards a target, an anode positioned to produce an accelerating electric field adjacent to the target, said anode also for producing a glow discharge plasma which is confined by the magnetic fields at predetermined apex regions, and connecting means for connecting electrodes to a source of electrical potential, said apparatus characterized by a cathode comprising a cathode body, a backing plate connected removably to the cathode body, a copper common plate secured to a bottom of said backing plate, and a multi-rod type target including a plurality of vertical rods of magnetic material to be sputtered, each rod having a sputtering surface of hemisperhic form on the apex thereof, and being connected to and directed downward from said copper common plate.

4,879,018

LOW VOLTAGE ANODIZING PROCESS AND APPARATUS

Charles Fenoglio, 6690 7 Mile Rd., South Lyon, Mich. 48178; Peter Kljucaricek, 6732 Lozier, Warren, Mich. 48091; Jeffrey Pernick, 3504 Edgewood Park Dr., Commerce Township, Oakland County, Mich. 48085, and Fred C. Schaedel, 12812 Valley View #18, Garden Grove, Mich. 92645

Filed Dec. 19, 1986, Ser. No. 943,510
Int. Cl.[4] C25D *11/00, 21/00*
U.S. Cl. 204—56.1 **2 Claims**



1. A low voltage anodizing process for anodic oxidation of metals in which are used: (i) an anodizing bath containing an electrolyte, an anode and a cathode; and (ii) an AC fed DC power supply for supplying pulsating DC power to the anodizing bath; said anodizing process comprising supplying pulsating D.C. power to the anodizing bath and cyclicly discharging inherent capacitance in the anodizing bath; said cyclic discharge of said inherent capacitance being accomplished by providing successive power cycles wherein each such power cycle consists of a rise portion followed by a fall portion followed by an off-time portion; and providing a shunt discharge path in an electical circuit across the anode and cathode and being external to the anodizing bath for discharging said inherent capacitance during the last part of such fall portion and all during such off-time portion of each power cycle, a significant fraction of the total anodizing current being shunted across said discharge path; said fraction being large enough to completely discharge said inherent capacitance and to empty it of accumulated charges thereon prior to the rise portion of the next subsequent power cycle, there being no capacitor in said electrical circuit across the anode and cathode and external to the anodizing bath.

4,879,019

HYDROCARBON CONVERSION PROCESS FOR SELECTIVELY MAKING MIDDLE DISTILLATES

John W. Ward, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 28,654, Mar. 20, 1987, Pat. No. 4,762,813, which is a continuation of Ser. No. 793,567, Oct. 31, 1985, abandoned, which is a continuation-in-part of Ser. No. 699,919, Feb. 8, 1985, Pat. No. 4,610,973, which is a continuation of Ser. No. 531,924, Sep. 13, 1983, Pat. No. 4,517,074, which is a division of Ser. No. 84,761, Oct. 15, 1979, Pat. No. 4,419,271. This application Apr. 4, 1988, Ser. No. 196,942
Int. Cl.[4] C10G *47/20*
U.S. Cl. 208—111 **28 Claims**

1. A hydrocarbon conversion process which comprises contacting a hydrocarbon feedstock with a hydrocarbon conversion catalyst under hydrocarbon conversion conditions to

convert said feedstock into hydrocarbon conversion reaction products, wherein said catalyst is prepared by the process comprising:

(a) extruding a mixture of a porous, inorganic refractory oxide component and a crystalline aluminosilicate zeolite having cracking activity to form extrudates, wherein said zeolite is selected from the group consisting of Y zeolites, and X zeolites; and

(b) calcining said extrudates in the presence of added steam at a water vapor partial pressure greater than about 2.0 p.s.i.a. under conditions such that the unit cell size of said crystalline aluminosilicate zeolite is reduced to a value between about 24.20 and about 24.35 Angstroms.

4,879,020

METHOD OF OPERATING A FURNACE HYDROCARBON CONVERTER

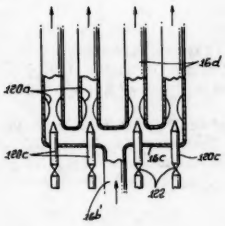
Frank W. Tsai, San Marino, Calif., assignor to Kinetics Technology International, Monrovia, Calif.

Division of Ser. No. 47,210, May 8, 1987, Pat. No. 4,792,436. This application Oct. 17, 1988, Ser. No. 258,771

The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.

Int. Cl.[4] C10G *9/16, 9/36*

U.S. Cl. 208—130 **3 Claims**



1. A method of operating a hydrocarbon, converter furnace having an upper conversion heating section and a lower radiant heating section, and tubing extending through said sections to convey a fluid hydrocarbon feed and steps in sequence through the convection and radiant heating sections, the steps that include:

(a) providing said tubing to have a common feed section and multiple branches extending therefrom in the radiant section of the furnace, each of said branches having an inlet in fluid communication with the feed section, and effecting hydrocarbon and steam flow from the feed section into each of said branches,

(b) providing valve means in each of said branches controlling the rates of flow of hydrocarbon and steam in said branches to reduce differential coking therein,

(c) orienting said branches to extend generally upright in and relative to said radiant heating section of the furnace, and providing the feed section with a downcomer and a U-shaped section, both extending in said radiant section of the furnace and through which hot feed hydrocarbon and steam are fed upwardly to said branches,

(d) providing said branches with main extents in said radiant section, and providing said valve means to include control valves in each of said branches, the control valves having openings and separately movable stoppers, and moving the stoppers within the branches for increasing or decreasing the flow rates of hydrocarbon and steam through the openings of the control valves in the main extents of said branches in said radiant section,

(e) said stoppers including nozzle means controllably introducing dilution steam therethrough into the branches, said nozzle means including separately adjustable valves and including the steps of separately controlling the amount of dilution steam fed to each of said branches through the nozzle means of each stopper in said branch to thereby minimize differential coking in the branches.

4,879,021

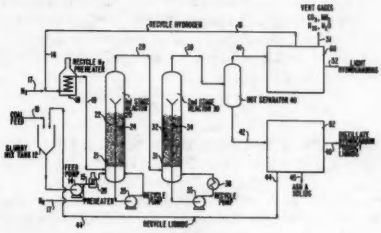
HYDROGENATION OF COAL AND SUBSEQUENT LIQUEFACTION OF HYDROGENATED UNDISSOLVED COAL

Edwin J. Hippo, Makanda, Ill.; Alfred G. Comolli, Yardley, Pa., and Robert O'Brien, Jackson, N.J., assignors to HRI, Inc., Lawrenceville, N.J.

Continuation of Ser. No. 33,856, Apr. 6, 1987, abandoned, which is a continuation of Ser. No. 874,886, Jun. 16, 1986, abandoned, which is a continuation of Ser. No. 472,915, Mar. 7, 1983, abandoned. This application Aug. 26, 1988, Ser. No. 237,636

Int. Cl.[4] C10G *1/00, 1/06*

U.S. Cl. 208—413 **17 Claims**



1. A continuous two reactor stage coal conversion process for catalytic hydrogenation of coal particles and subsequent liquefaction thereof for producing coal-derived hydro-carbon liquid and gas products, said process comprising:

(a) mixing solid coal particles having particle size ranging from about 20 mesh to about 400 mesh (U.S. Sieve Series) with hydrocarbon liquid solvent in a solvent/coal weight ratio at least sufficient to provide a flowable coal/oil slurry feed of said solid coal particles, a substantial portion of said hydrocarbon solvent having a normal boiling point ranging from about 400° F. to about 1100° F.;

(b) passing said coal/oil slurry and hydrogen upwardly through a first reaction zone containing hydrocarbon solvent liquid which is partly generated from the coal and substantially hydrogenated therein, said first reaction zone containing a catalytic ebullated bed of particulate solid hydrogenation catalyst maintained at a temperature ranging from about 550° F. to about 650° F., and having a hydrogen partial pressure of 100 to 2000 psig for a residence time between about 5 minutes and about 90 minutes to substantially hydrogenate said solvent oil and said solid undissolved coal particles simultaneously in said coal/oil slurry by transfer of gaseous hydrogen to the solvent oil and coal particles without substantial liquefaction of the coal, said catalyst containing an active non-alkali metal or metal compound selected from the group consisting of Co/Mo, Ni/Mo, Li, Sn promoted Co/Mo, W promoted Co/Mo, NiS, CoS, MoS, FeS, FeS_2, LiH, MgH_2 and mixtures thereof supported on a porous substrate material, said first catalytic ebullated bed reaction zone being back mixed by recycled liquid slurry within the reaction zone;

(c) withdrawing said coal/oil slurry effluent containing said hydrogenated coal particles from said first reaction zone and passing said coal/oil slurry through a second reaction zone containing a catalytic ebullated bed of particulate hydrogenation catalyst which is maintained at a temperature between about 700° F. and about 850° F., and a hydrogen partial pressure of 100 to 2000 psig for a residence time of about 1 to 90 minutes to liquefy and convert said hydrogenated coal particles to gas and liquid fractions, said catalyst containing an active non-alkali metal or metal

compound supported on a porous substrate material, said second catalytic ebullated bed reaction zone being back mixed by recycled liquid within the reaction zone;

(d) passing said gas and liquid fractions from said second reaction zone to a gas-liquid-solids separation zone, from which separation zone a coal-derived hydrocarbon liquid stream containing a reduced solids concentration is recycled directly without further hydrogenation to said coal slurrying step to provide at least part of the hydrocarbon solvent liquid for said coal/oil slurry feed, a recovered hydrogen gas stream is recycled to said first reaction zone to provide the hydrogen partial pressure in the first reaction zone, and a liquid stream is removed containing an increased concentration of insoluble materials and ash; and

(e) recovering from said separation zone hydrocarbon liquid distillate and gaseous hydrocarbon products, whereby the substantial catalytic hydrogenation of the coal particles in the first reaction zone before catalytic liquefaction in the second reaction zone provides increased yields of C4-975° F. fraction hydrocarbon liquid products, with the yield of cyclohexane soluble product material being about 60–90 W% of the coal feed.

4,879,022

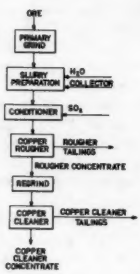
ORE FLOTATION PROCESS AND USE OF MIXED HYDROCARBYL DITHIOPHOSPHORIC ACIDS AND SALTS THEREOF

Alan C. Clark, Mentor; Edward P. Richards, Chagrin Falls, both of Ohio, and Douglas R. Shaw, Lakewood, Colo., assignors to The Lubrizol Corporation, Wickliffe, Ohio

Continuation of Ser. No. 72,809, Jul. 14, 1987, abandoned. This application Jan. 19, 1989, Ser. No. 300,694

Int. Cl.[4] B03D *1/02*

U.S. Cl. 209—166 **34 Claims**



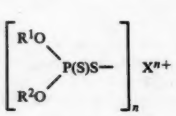
1. A process of effecting the concentration of a metal value selected from the group consisting of zinc, copper and lead, from a sulfide ore containing said metal value and at least one of pyrite or pyrrhotite, with selective depression of said at least one of pyrite or pyrrhotite comprising the steps of:

(A) grinding the ore to an appropriate size range;

(B) preparing a slurry comprising

(B-1) said ground ore;

(B-2) at least one metal value collector which is a water-dispersible or soluble dihydrocarbyl dithiophosphoric acid or salt having the formula



(I)

wherein R^1 is an alkyl group containing from 2 to about 12 carbon atoms and R^2 is an aryl group containing from 6 to about 18 carbon atoms, n is an integer equal to the valence of X and X^{n+} is a dissociating cation; and

(C) conditioning the slurry with SO_2 under aeration at a pH of about 6.0 to about 7.0 in an amount sufficient to depress said at least one of pyrite or pyrrhotite;

(D) subjecting the conditioned slurry to froth flotation to produce a froth containing a metal value rougher concentrate and a resultant slurry containing said at least one of pyrite or pyrrhotite which was depressed during the flotation;

(E) collecting said froth; and

(F) recovering the metal value rougher concentrate containing the metal values.

4,879,023

CONVEYOR ASSEMBLY

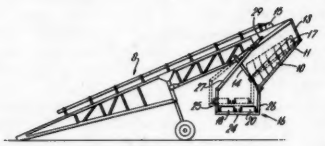
Michael L. Mallaghan, Dungannon, United Kingdom, assignor to Powerscreen International Limited, County Tyrone, United Kingdom

Continuation of Ser. No. 115,573, Oct. 7, 1987, abandoned, which is a continuation of Ser. No. 867,225, May 27, 1986, abandoned. This application Sep. 16, 1988, Ser. No. 245,970

Claims priority, application United Kingdom, May 28, 1985, 8513428

Int. Cl.[4] B07B *1/00*

U.S. Cl. 209—241 **3 Claims**



1. A conveyor assembly comprising a main inclined conveyor having a loading end and a discharge end with a screen box having a loading end and a discharge end located at the discharge end of the conveyor, said main conveyor and screen box being located on an elongated structure having a loading end and a discharge end including length adjustable legs intermediate its ends mounted on wheels, in which the loading end of the screen box is pivoted about an axis traversely of and at the discharge end of the structure with the discharge end of the screen box extending towards the loading end of the structure, the discharge end of the screen box being connected to said structure by length adjustable means thereby to alter the inclination of said box, and a cradle is suspended below said structure to carry at least one boom conveyor to receive a grade of material, said cradle being horizontally oriented and connected by linkage with said structure and said box whereby pivotal movement of said box causes synchronous movement of the cradle such as to maintain a horizontal orientation of said cradle, and

wherein said at least one boom conveyor comprises two lateral boom conveyors mounted on said cradle to extend in opposite directions therefrom.

4,879,024

ELASTOMERIC ELEMENT FOR FORMING SURFACES ENGAGEABLE WITH LOOSE ABRASIVE MATERIALS, AND A SIZING SCREEN MADE FROM SUCH ELEMENTS

Alfred G. Chervonenko; Vladimir P. Naduty; Vladimir L. Morus; Valery I. Kravchenko, and Viktor A. Lavrukhin, all of Dnepropetrovsk, U.S.S.R., assignors to Institut Geotekhnicheskoj Mekhaniki, Dnepropetrovsk, U.S.S.R.

Filed Mar. 25, 1988, Ser. No. 173,377
Int. Cl.[4] B07B *1/04*
U.S. Cl. 209—352 4 Claims

1. An elastomeric element for forming a surface engageable with loose abrasive materials comprising:

(a) a base having two ends and a working surface, to engage loose abrasive materials, in the form of a surface of revolution having an axis; said base in a section perpendicular to the axis of said surface of revolution, having the form of a sector of a ring; and

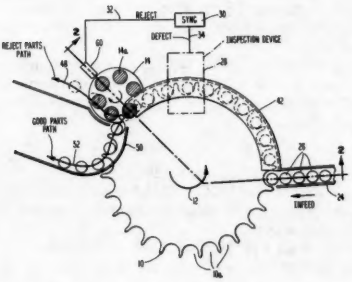
(b) at least two attachment means connected to said base in a configuration to provide absence of tension in the surface engageable with the abrasive material when the element is mounted.

4,879,025

APPARATUS FOR SORTING PARTS

Michael Shapcott, Tamaqua, Pa., assignor to Zapata Technologies, Inc., Hazelton, Pa.

Filed Jan. 21, 1988, Ser. No. 146,517
Int. Cl.[4] B07C *5/00*
U.S. Cl. 209—559 10 Claims



1. Apparatus for inspecting a stream of parts and for removing defective parts from the stream of parts, comprising:

means for controlling the spacing of said parts along a portion of said stream, said spacing means comprising a moving member having a series of regularly spaced recesses along its periphery for receiving parts from said stream at a supply station, and for advancing said parts to and discharging them at a discharging station;

inspection means at a predetermined location along the portion of the stream along which the spacing of the parts is controlled by said spacing means, for providing a rejection signal with respect to a defective part; and

rejection means responsive to said rejection signal, comprising:

a first rotating disc carrying a plurality of individually-actuable means for removing parts spaced equally about the axis of rotation of said first rotating disc, each means for removing parts being individually actuable responsive to said rejection signal for removing parts from said recesses in the periphery of said spacing means, the disc being located and rotated with respect to said spacing means such that the linear speed and spacing of said means for removing parts are substantially equal to the linear speed and spacing of first rotating disc;

a friction disc mounted co-axially and rotating with said first rotating disc, said friction disc being spaced from said first rotating disc by a distance at least equal to one of the dimensions of said parts and greater than the thickness of the periphery of the spacing means in which said recesses are formed, so that said parts in their corresponding recesses are disposed between said friction disc and said first rotating disc, and wherein said means for removing parts when actuated each urge the corresponding part against the friction disc, whereby the subsequent rotation of the first and friction discs withdraws the part from its recess; and

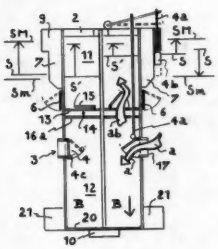
synchronization means for communicating said rejection signals from said inspection means to said individually actuable means for removing parts.

4,879,026

DEVICE FOR THE COLLECTION OF VARIOUS SUBSTANCES PRESENT IN A LIQUID

Jacques J. Metais, 72, rue du Cherche-Midi, 75006 Paris, France

Division of Ser. No. 691,571, Dec. 11, 1984. This application May 27, 1987, Ser. No. 81,852
Int. Cl.[4] C02F *1/40*; B01D *17/025*
U.S. Cl. 210—123 6 Claims



1. A buoyant device for collecting various non-floating substances present in a liquid the surface of which is choppy or rough, said substances having a higher density than the liquid, comprising:

a. a tank having at least one internal compartment which is in communication with the atmosphere through an upper aperture, said compartment being partly submerged in a liquid external to said tank, so that the external liquid surface may have, with respect to said compartment, vertical alternate movements between a higher level and a lower level;

b. said compartment being in communication with the external liquid through at least one inlet opening provided with an inlet valve, said inlet opening being positioned underneath the lowest level of the liquid surface, said inlet opening being submerged completely and continually, for allowing the external liquid and said non-floating substances to come into said compartment;

c. said compartment being in communication with the external liquid through at least one outlet opening which is fitted with an outlet valve, said outlet opening being positioned at a level above the level of said inlet opening, to prevent said non-floating substances from escaping from said compartment, said non-floating substances being trapped inside said compartment beneath the level of said outlet opening;

d. said inlet valve and said outlet valve being able to function freely and automatically, under the sole effect of the variations of the level of the liquid surface with respect to said compartment;

e. said compartment being divided into two superposed chambers, that is one lower chamber and one upper chamber, said lower chamber being in communication with the external liquid through said inlet opening, said upper chamber being in communication with the external liquid through said outlet opening and with the atmosphere through said upper aperture, said lower chamber and said upper chamber being in communication one with the other through an opening fitted with a non-return valve allowing an inner current going upwardly from said lower chamber to said upper chamber and preventing a flow in the opposite direction;

f. said inlet opening of said compartment being provided with a locking mechanism which is able to prevent the opening of said inlet valve as long as the external liquid surface has not reached a definite level, and said locking mechanism allowing the opening of said inlet valve when the external liquid surface reaches and rises above the said definite level;

g. said compartment being provided with filter means which are able to collect and to hold back inside said compartment various substances having nearly the same density as the liquid flowing into said compartment;

h. submerged volumes which are associated with the lower part of said tank and placed at a certain depth beneath the average level of the liquid surface with respect to said tank, said submerged volumes being able to reduce and to limit the amplitude of the vertical movements of the tank when the liquid surface is rough.

4,879,027

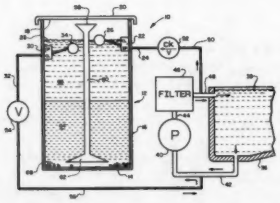
BINARY FLUID SYSTEM, AND COMPONENTS THEREOF, FOR PRODUCING AN IMPREGNATED METERED FLUID STREAM

John T. Sanders, Thousand Oaks, Calif., assignor to A. W. Schlottmann, Thousand Oaks, Calif.

Continuation-in-part of Ser. No. 34,062, Apr. 2, 1987, abandoned. This application Sep. 18, 1987, Ser. No. 161,200

Int. Cl.[4] E04H *3/16*

U.S. Cl. 210—123 24 Claims



24. A swimming pool water treatment unit comprising: a separator tank, said separator tank provided a tank bottom and having a lower portion containing a first body of treatment material in water solution which has a density greater than water and also an upper portion; a quantity of pool water from an external swimming pool disposed in said upper portion and comprising a second body constituted by said pool water, said first and second bodies meeting in continuous contact at an uninterrupted juncture accommodating migration upwardly across said entire juncture of elements of said first body upwardly into said second body; an inlet line connected to said pool and affixed to and communicating into said upper portion of said tank; means associated with said inlet for controlling the level of water in said separator tank; an adjustable metered outlet from said upper portion of said tank for connection to said external swimming pool; and externally accessible means in lower terminal communication solely with said tank lower portion for non-turbulently delivering the additional placement of a like body of treatment material in water solution directly and solely in said lower portion of said tank.

4,879,028

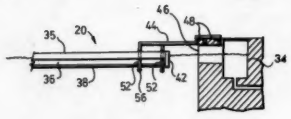
DEBRIS DIVERTING BOOM

John Gibson, R. R. #3, Campbellville, Ontario, Canada (L0P 1B0)

Filed Aug. 30, 1988, Ser. No. 238,219

Int. Cl.[4] E04H *3/20*

U.S. Cl. 210—169 19 Claims



1. A debris diverting boom for diverting debris floating on the surface of a body of a liquid circulating in a tank or pool toward the edge thereof said boom comprising:

an elongated hollow tubular body portion and an integral elongated skirt portion roll-formed from an elongated strip of metal, the sharp free edge of the part of the metal strip forming the skirt portion being folded back on itself so that the lower edge of the skirt is constituted by a fold junction;

plastic caps having tube and skirt portions and covering the metal boom ends to cover the sharp free edges of the metal strip;

flotation means within the interior of the hollow tubular body portion and providing sufficient buoyancy to the boom to keep it afloat despite entry of water to the interior; and

bracket means engageable with the boom body portion and with the tank or pool edge for holding said boom in place extending across said circulating liquid at an angle to the liquid flow.

4,879,029

LIQUID CHROMATOGRAPH APPARATUS

Martin A. Whitehead, Landbeach, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 18, 1989, Ser. No. 339,938

Claims priority, application United Kingdom, Sep. 17, 1986, 8622328

Int. Cl.[4] B01D *15/08*

U.S. Cl. 210—198.2 10 Claims

1. A liquid chromatograph apparatus comprising

reciprocating piston pump means for pumping solvent,

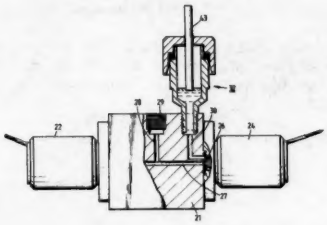
first means for selecting and for feeding at least one of a plurality of solvents to an input of said reciprocating pump means, said first means including

a plurality of solvent sources,

proportioning valve means for feeding solvent to said reciprocating piston pump means, said proportioning valve means having a plurality of valves for feeding at least one of said plurality of solvents to said reciprocating pump means,

wherein each of said valves has inlet means for connecting to

at least one of said plurality of solvent sources, said inlet means for each of said valves including a chamber having a solvent inlet and a solvent outlet, said chamber being partly occupied by at least one gas, and said chamber being adjacent to said proportioning valve means, wherein said chamber structure enables constant flow of solvent to prevent irregular opening of said valves by dissipation in said gas and wherein said chamber includes a hollow body portion and a cap portion, said body portion communicating with said inlet means of said valves, said cap portion having a tube projecting from said at least one solvent



sources to said body portion, said tube passing solvent from said solvent sources to said chamber, and said cap portion being detachable from said body portion, and

wherein each of said valves has an outlet coupled to an input of said reciprocating piston pump means,

second means for feeding an output of said reciprocating piston pump means to a separating column,

third means for injecting a sample into said solvent flowing from said reciprocating piston pump means to said separating column, and

detector means for detecting separated components of said sample in eluent from said separating column.

4,879,030

APPARATUS FOR TRANSFORMING SEA WATER, BRACKISH WATER, POLLUTED WATER OR THE LIKE INTO A NUTRIOUS DRINK BY MEANS OF OSMOSIS

Knut Stache, Darmstadt, Fed. Rep. of Germany, assignor to DD-Dynamic Devices Ltd., London, England

Continuation of Ser. No. 873,109, Jun. 10, 1986, abandoned, which is a continuation of Ser. No. 617,182, Jun. 4, 1984, abandoned, which is a continuation of Ser. No. 471,636, Mar. 3, 1983, abandoned, which is a continuation-in-part of Ser. No. 298,025, Aug. 31, 1981, abandoned, which is a continuation-in-part of Ser. No. 94,666, Nov. 15, 1979, abandoned. This application Jun. 1, 1987, Ser. No. 57,719

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1978, 285105; Jun. 19, 1979, 7917456

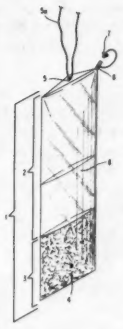
Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—238 **10 Claims**

1. A housing forming an interior chamber and comprising:

a semipermeable membrane portion communicating with said chamber and having an outer membrane surface,

a flexible porous layer of salt permeable material covering at least said outer membrane surface of said membrane portion, said membrane portion retaining salt while allowing purified water to pass therethrough into said chamber by regular osmosis, and



at least one efflux tube communicating with said chamber and through which purified water may pass from said chamber.

4,879,031

BLOOD CENTRIFUGATION CELL

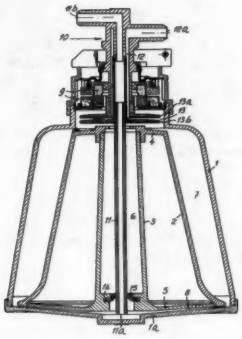
Ivo Panzani, Mirandola, Italy, assignor to Dideco S.p.A., Mirandola, Italy

Filed Apr. 6, 1988, Ser. No. 177,721

Claims priority, application Italy, Apr. 7, 1987, 20036 A/87

Int. Cl.[4] B04B *15/00, 7/08;* **B01D** *33/00*

U.S. Cl. 210—360.2 **5 Claims**



1. A centrifugation cell for blood and biological liquids, comprising:

an outer container rotatable about a central axis having an outer wall, an upper end and an enclosed bottom;

a volume displacement body having an upper end, a lower end and a generally cylindrical central longitudinal passage therein, and coaxially enclosed within said container with the lower end closely spaced from the bottom of said container;

a stationary housing connected to and enclosing the upper end of said container through an annular rotatable seal and consisting of a coaxial first conduit adapted for the initial inflow of blood, a generally coaxial second conduit adapted for the outflow of light blood fraction components and a means providing a stationary passage within said housing near the upper end of said container and in communication with said second conduit;

said first conduit extending downwardly through the central passage of said body with the end thereof closely spaced from the bottom of said container;

said body further having a means for substantially sealing the space between said first conduit and the central passage at a location near the lower end of said body for facilitating the outflow of red blood components from said container.

4,879,032

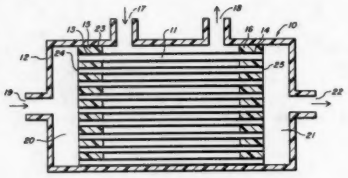
FLUID SEPARATORY DEVICES HAVING IMPROVED POTTING AND ADHESIVE COMPOSITIONS

John C. Zemlin, Reading, Mass., assignor to Allied Resin Corporation, East Weymouth, Mass.

Filed Jun. 4, 1984, Ser. No. 616,736

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—321.61 **36 Claims**



1. A hollow-fiber, fluid separatory device comprising a bundle of fine hollow fibers whose end portions are potted in a tube-sheet and whose open fiber ends terminate in a tube-sheet face, the bundle being sealed within a casing to form a separatory cell having one or more fluid ports which allow for the passage of one fluid through the fibers and another around the fibers without mixing of the two fluids, said tube-sheet comprising a cured polyurethane composition which is substantially bubble-free although cured in the presence of moisture, said composition comprising the reaction product of an aliphatic polyisocyanate with a propoxylated polyether amine in the presence of a metallo-organic catalyst selected from the group consisting of the organic acid salts and the β-diketonates of zinc, iron, copper, manganese, mercury, lead, and mixtures thereof, and said catalyst being present in an amount effective to substantially increase the cure rate and permit curing in the presence of moisture without significant bubble formation.

4,879,033

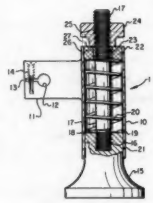
SLURRY PLOW

Arthur R. Rich, Caddo Mills, Tex., assignor to Pilgrim's Pride Corporation, Pittsburg, Tex.

Filed Aug. 26, 1988, Ser. No. 237,604

Int. Cl.[4] B01D *33/04, 33/36*

U.S. Cl. 210—396 **20 Claims**



1. A slurry plow comprising a hollow elongated housing having an upper end and a lower end, a foot member having an upper portion adapted for slidable engagement with the lower interior surface of said elongated housing and for telescoping therewithin, biasing means within said housing for resiliently biasing said foot member to a predetermined position with respect to said housing whereby said foot member is correspondingly telescoped a predetermined distance within said housing, adjusting means for adjusting said predetermined distance, and means including said biasing means responsive to the application to said foot member of a force greater than the bias of said biasing means to cause said foot member to telescope an additional distance within said housing.

4,879,034

DEWATERING DEVICE WITH TWO FILTERING BELTS

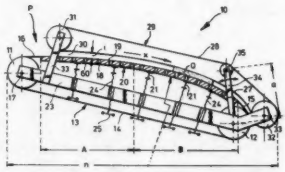
Wendel Bastgen, Betzdorf/Sieg, Fed. Rep. of Germany, assignor to Alb. Klein GmbH & Co. KG, Niederfischback, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 714,630, Mar. 21, 1985, abandoned. This application Sep. 27, 1988, Ser. No. 250,045

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1984, 3410745

Int. Cl.[4] B01D *33/04;* **B01B** *5/06*

U.S. Cl. 210—400 **11 Claims**



1. A dewatering device comprising a first endless band and a second endless band spaced from said first endless band and forming a pressure zone gap therebetween, each of said endless bands being movable around and between pairs of guide rollers in one driving direction, an adjustable perforated supporting plate formed from a flexible material for supporting one of said endless bands, said supporting plate having a pair of generally parallel surfaces and being adjustable over substantially its entire length, one of said surfaces defining a curved surface having a radius of curvature which decreases toward the driving direction whereby said one surface biases said one of said endless bands in the pressure zone.

4,879,035

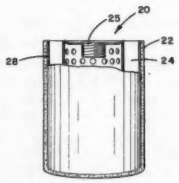
ALL SEASON FUEL FILTER

Allen O. Thompson, P.O. Box 182, Granville, N. Dak. 58741

Continuation of Ser. No. 99,774, Sep. 22, 1987. This application Feb. 17, 1989, Ser. No. 312,382

Int. Cl.[4] D01D *35/02*

U.S. Cl. 210—416.4 **3 Claims**



1. A fuel filter, comprising:

(a) a fuel filter housing having sides, a bottom and a top; and

(b) a separate, distinct insulating layer of urethane material being permanently attached to the outside of the fuel filter housing along the sides and bottom of the fuel filter hous-

ing so as to insulate the fuel filter from its ambient surroundings.

4,879,036

ASYMMETRICAL MEMBRANE OF POLYESTER-AMIDE AND PROCESS FOR PREPARING IT

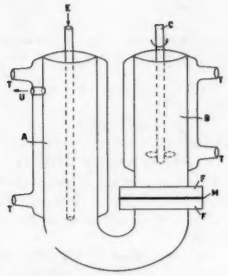
Francesco Pittalis; Francesco Bartoli, and Otello Farias, all of Rome, Italy, assignors to Eniricerche, S.p.A., Milan, Italy

Filed Jun. 9, 1987, Ser. No. 60,120

Claims priority, application Italy, Jun. 20, 1986, 20862 A/86

Int. Cl.[4] B01D *13/00;* **C08J** *9/28*

U.S. Cl. 210—500.38 **15 Claims**



1. An asymmetrical membrane suitable for dialysis and ultrafiltration comprising: polyester-amide $(TATE)_n$, wherein T represents a radical of terephthalic acid, A represents a radical of hexamethylenediamine, and E represents a radicla of hexanediol, said polyester-amide having a relative viscosity of from 2 to 2.5, a content of free carboxy groups of from 15 to 25 meq/kg, and a melting point of from 252° to 260° C., said membrane displaying a thickness of from 15 to 190 μm, a water permeability of from about 3 up to about 9 liters/m^2/hour, for a ΔP of 300 mm_{Hg} and being effectively permeable for substances having a molecular weight of up to about 17,000.

4,879,037

METHOD AND APPARATUS FOR COUNTER CURRENT LIQUID-LIQUID EXTRACTION

Gustav E. Utzinger, Kastelweid 231,, 4249 Himmelried, Switzerland

Division of Ser. No. 852,633, Apr. 16, 1986, Pat. No. 4,749,130, which is a continuation-in-part of Ser. No. 523,175, Aug. 15, 1983, abandoned. This application Mar. 17, 1988, Ser. No. 169,498

Claims priority, application Switzerland, Aug. 14, 1982, 4855/82

Int. Cl.[4] B01D *11/04*

U.S. Cl. 210—634 **12 Claims**

1. A method of liquid-liquid extraction of at least one solute dissolved in a first liquid being a solution of said solute in a solvent therefor, comprising the steps of

(a) directing a stream of said first liquid through a first elongated channel from an entry end toward a terminal end of said first channel, and maintaining in said first channel a determined pressure above ambient,

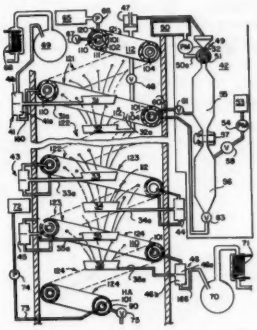
(b) directing a stream of a second liquid of different density, counter-currently to said first liquid stream, through a second elongated channel from an entry end toward a terminal end of said second channel, and maintaining in said second channel a pressure lower than said pressure in said first channel,

said first and second channels having longitudinal axes, and one of said first and second liquids being the heavier, and the other the lighter one,

(c) maintaining between said first and second channels, a separating wall zone of liquid-tight elastically resilient material being substantially non-swelling when in contact with water having a temperature of 60° C. or higher, or when in contact with organic extraction solvents, said wall zone having a first and a second contact surface on opposite sides thereof, which surfaces border on said first and second channels, respectively, extending parallel with the axes of said channels;

said wall zone containing a plurality of crosswise passages therethrough from said first to said second contact surface, said passages being distributed uniformly along said wall zone in axial direction,

(d) passing a large number of streams of said first liquid, ejected from said first channel through said passages successively into said second channel and intermingling said first liquid streams therein cross-currently with said stream of second liquid flowing countercurrently through said second channel, while at the same time maintaining said exit end of said first channel at least substantially obturated, thereby maintaining in said first channel a determined pressure above the pressure prevailing in said second channel, and maintaining said exit end of said second channel obturated,



(e) ejecting a large number of fine liquid jets of the resulting liquid mixture iteratively out of said second channel, transversely to the direction of liquid flow through said second channel;

(f) collecting groups of said liquid jets, from successive ejection zones of said second channel,

(g) settling the portions of the liquid mixture, obtained from such zones, with phase separation,

(h) separating the resulting heavier and lighter phases of each liquid portion from each other,

(i) back-feeding the separated heavier phase of a liquid portion from an intermediate zone of said second channel, into approximately the same zone, but of that channel which contains the stream of the heavier liquid, and

(j) back-feeding the lighter phase of a liquid portion from an intermediate zone of said second channel, into approximately the same zone of that channel which contains the stream of the lighter liquid;

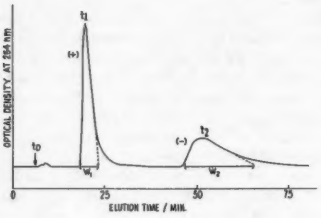
(k) recovering from that ejection zone last preceding the terminal end of said second channel one of said phases resulting from the separation of the liquid portion collected from said zone, and back-feeding the other phase into the said first channel, in said last-mentioned ejection zone.

4,879,038

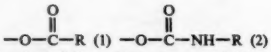
SEPARATION AGENT COMPRISING ACYL- OR CARBAMOYL-SUBSTITUTED POLYSACCHARIDE

Hajime Namikoshi; Tohru Shibata, and Ichiro Okamoto, all of Himeji, Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

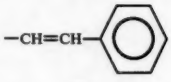
Continuation-in-part of Ser. No. 716,791, Mar. 27, 1985, abandoned. This application Sep. 19, 1988, Ser. No. 246,449
Claims priority, application Japan, Mar. 29, 1984, 59-365
Int. Cl.[4] B01D *15/08*
U.S. Cl. 210—635 **15 Claims**



1. A method of separating a chemical substance from a mixture containing the same, which comprises the step of treating said mixture with a polysaccharide derivative selected from the group consisting of β-1,4 glucans, α-1,4 glucans, α-1,6 glucan, β-1,6 glucan, β-1,3 glucans, α-1,3 glucan, β-1,2 glucan, β-1,4 galactan, β-1,4 mannan, α-1,6 mannan, β-1,2 fructan, β-2,6 fructan, β-1,4 xylan, β-1,3 xylan, β-1,4 chitosan, β-1,4-N-acetylchitosan, pullulan and alginic acid, said polysaccharide derivative having 30–100% of the hydroxyl groups thereof substituted with a substituent selected from the group consisting of an acyl group of the formula (1) and a carbamoyl group of the formula (2):



wherein R is selected from the group consisting of



and substituted derivatives thereof.

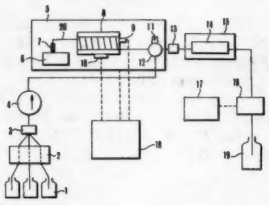
4,879,039

PROCESS FOR MEASURING STABLE-TYPE GLYCATED HEMOGLOBIN IN A SAMPLE

Hiroaki Takahashi, Sagamihara; Haruo Okada, Machida; Katsuya Matsumoto, and Masuo Umino, both of Atsugi, all of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shinnanyo, Japan

Filed Jul. 30, 1987, Ser. No. 79,435
Claims priority, application Japan, Jul. 30, 1986, 61-177599
Int. Cl.[4] B01D *15/08*
U.S. Cl. 210—635 **3 Claims**

1. A process for measuring the amount of stable-type glycated hemoglobin in a sample using high performance liquid chromatography, comprising heating to a temperature of at least 45° C. a sample diluted with a hemolysis agent containing a reagent for the removal of unstable-type glycated hemoglobin comprising boric acid to achieve the removal of the unstable-type glycated hemoglobin, and analyzing the sample by high performance liquid chromatography.

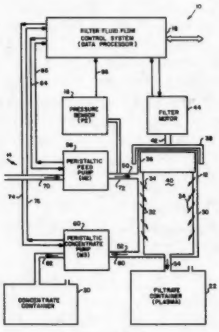


4,879,040

ADAPTIVE FILTER CONCENTRATE FLOW CONTROL SYSTEM AND METHOD

Paul R. Prince, Fountain Valley; Michael G. Ford, Riverside; Donald W. Schoendorfer, Santa Ana, and Ronald L. Clark, Westminster, all of Calif., assignors to Baxter International Inc., Deerfield, Ill.

Continuation of Ser. No. 166,833, Mar. 4, 1988, abandoned, which is a continuation of Ser. No. 671,576, Nov. 15, 1984, abandoned. This application Dec. 22, 1988, Ser. No. 291,413
Int. Cl.[4] B01C *13/00*
U.S. Cl. 210—637 **31 Claims**



1. A fluid flow control system for controlling a flow of filtrate through a filter system having a filter membrane with a predictable transmembrane pressure-filtrate flow rate relationship when the filter system is operated under nonobstructing operating conditions, the control system comprising:

a flow regulating system coupled to control flows of feed fluid, concentrate fluid and filtrate fluid in the filter system in response to at least one control signal;

a pressure sensor disposed to sense and generate indications of transmembrane pressure in the filter system; and

a fluid flow control system coupled to receive an indication of transmembrane pressure from the pressure sensor and generate the at least one control signal to control the flow regulating system in response thereto maintain the transmembrane pressure at an intersection with a particular curve having a shape conforming to the predictable transmembrane pressure-filtrate flow rate relationship and a pressure offset from the received pressure indication by a predetermined positive pressure difference.

4,879,041

PROCESS FOR PRODUCING ULTRA-PURE WATER AND PROCESS FOR USING SAID ULTRA-PURE WATER

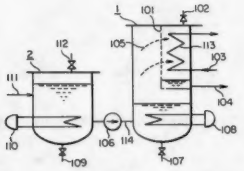
Hideaki Kurokawa; Akira Yamada, both of Hitachi; Yasuo Koseki, Hitachiota; Harumi Matsuzaki, Hitachi; Katsuya Ebara, Mito; Sankichi Takahashi, Hitachi; Hiroaki Yoda, Ibaraki; Nobuntsu Hayashi, Abiko; Isao Okouchi, Hitachi; Yukio Hishinuma, Hitachi, and Naohiro Momma, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 24, 1988, Ser. No. 172,583

Claims priority, application Japan, Mar. 25, 1987, 62-68893; Jun. 5, 1987, 62-139782; Aug. 14, 1987, 62-201718; Aug. 24, 1987, 62-209989; Sep. 17, 1987, 62-233399

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—640 15 Claims



1. A process for producing ultra-pure water which comprises boiling raw water to vaporize off volatile components from the raw water, subsequently generating steam from the boiled water from which said volatile components have previously been removed, contacting the steam with a hydrophobic, porous, gas-permeable and liquid-impermeable membrane to make the steam permeate the membrane and removing liquid mist sufficient to produce a high purity steam substantially free of impurities, and then condensing the steam to form ultra-pure water.

4,879,042

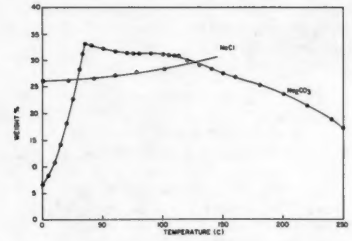
METHOD OF CRYSTALLIZING SALTS FROM AQUEOUS SOLUTIONS

Donald N. Hanson, 522 Moraga Way, Orinda, Calif. 94563, and Scott Lynn, 2646 San Antonio Dr., Walnut Creek, Calif. 94598

Continuation-in-part of Ser. No. 178,870, Aug. 18, 1980, Pat. No. 4,430,227, Ser. No. 567,764, Jan. 30, 1984, abandoned, Ser. No. 774,953, Sep. 11, 1985, Pat. No. 4,632,760, and Ser. No. 946,809, Dec. 29, 1986, abandoned. This application Feb. 23, 1988, Ser. No. 159,372

Int. Cl.[4] B01D *11/04*

U.S. Cl. 210—642 17 Claims



8. A method of crystallizing an inorganic solute from an aqueous solution, said solute having a solubility (in water) that changes relatively little with temperature such that the crystallization of solute from aqueous solution by adjustment of temperature results in a low yield, said method comprising:

(a) providing an aqueous solution of such solute which is saturated or substantially saturated at T_1

(b) providing a hydrophilic organic solvent

(c) contacting solution (a) with solvent (b) at T_1 in a crystallizing zone, thereby producing (1) a solvent-rich phase and a water-rich phase or (2) a single solvent-rich liquid phase, T_1 being selected so that the ratio of the solute to water in the solvent-rich phase is substantially less than in solution (a), thereby causing crystallization of a portion of the solute,

(d) separating crystals of solute,

(e) separating all or a major portion of the solvent rich phase,

(f) adjusting the temperature of the separated solvent-rich stream by heating or cooling it from T_1 to T_2,

(g) contacting the solvent-rich stream from step (f) in an extraction zone with a concentrated aqueous solution of said solute at T_2, the temperature T_2 (differing from T_1) and the concentration of solute in the aqueous solution being such that the resulting dried solvent phase is suitable for recycling to the crystallizing zone,

(h) separating from the extraction zone the dried solvent phase and recycling it to the crystallizing zone

(i) separating from the extraction zone the diluted aqueous solution of solute

(j) employing all or a portion of the diluted solution separated i step (i) to dissolve solute from a solid source, resulting in solution (a) and

(k) employing the resulting solution (a) from step (j) in the crystallizing zone.

4,879,043

MANUFACTURE OF HIGH PURITY HYDROGEN PEROXIDE BY USING REVERSE OSMOSIS OSMOSIS

John H. Boughton, Wilmington, Del.; Ralph A. Butz, Orange, Tex.; Herman C. T. Cheng, Wilmington, Del.; Jonathan R. Dennis, Brighton, Tenn.; Brian T. Hannon, Hockessin, Del., and Janet H. Weigel, Bartlett, Tenn., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 20, 1988, Ser. No. 222,089

Int. Cl.[4] B01C *13/00*

U.S. Cl. 210—651 6 Claims

1. A process for the manufacture of high purity aqueous hydrogen peroxide (permeate) in which ionic impurities and organic carbon compounds are removed from an aqueous solution thereof in which the concentration of hydrogen peroxide is from 5 to 50 weight percent comprising

(a) feeding said solution to a reverse osmosis apparatus having a suitable semipermeable membrane selected from an aromatic polyamide, a polypiperazineamide or a polyacrylonitrile positioned therein at a sufficiently higher pressure to force the hydrogen peroxide solution through the membrane,

(b) removing said impurities and carbon compounds that do not permeate the membrane (concentrate), and

(c) removing the high purity aqueous hydrogen peroxide solution (permeate).

4,879,044

HIGHLY AROMATIC ANISOTROPIC POLYUREA/URETHANE MEMBRANES AND THEIR USE FOR THE SEPARATION OF AROMATICS FROM NON AROMATICS

Joseph L. Feimer, Bright's Grove; Bernd A. Koenitzer, Sarnia, both of Canada, and Robert C. Schucker, Baton Rouge, La., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

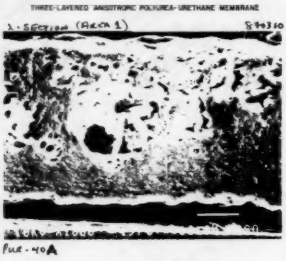
Division of Ser. No. 108,821, Oct. 14, 1987, Pat. No. 4,828,773. This application Feb. 3, 1989, Ser. No. 307,108

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—654 11 Claims

1. An anisotropic membrane: comprising layers of aromatic polyurea/urethane, including a thin dense layer, a thin non-

continuous skin and an open porous structure between the aforesaid thin dense layer and the thin non-continuous skin.



4. A method comprising separating aromatics from a mixture of aromatics with non-aromatics-saturates by contacting the mixture with one side of an anisotropic aromatic polyurea/urethane membrane characterized by possessing three layers.

4,879,045

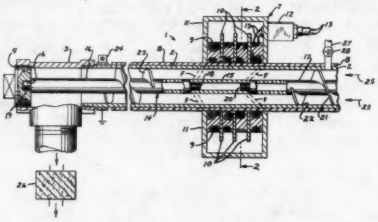
METHOD AND APPARATUS FOR ELECTROMAGNETICALLY TREATING A FLUID

Terry L. Eggerichs, P.O. Box 181, Wykoff, Minn. 55990

Continuation of Ser. No. 817,996, Jan. 13, 1986, abandoned. This application Nov. 9, 1987, Ser. No. 119,320

Int. Cl.[4] C02F *1/48*; B01D *35/06*; B03C *1/30*

U.S. Cl. 210—695 **41 Claims**



1. A method of treating a fluid with magnetic lines of force, comprising the steps of:

passing a fluid to be treated through a magnetic force field such that the fluid moves through the magnetic force field in a direction having a vector component at about a 90° relationship thereto by means of convoluting the flow of the fluid with baffle means located completely upstream from said magnetic force field; and

introducing ferrous ions from an auxiliary source of ferrous ions into said fluid at a location prior to the fluid passing through the magnetic force field.

4,879,046

LOCAL WATER CLEANING METHOD FOR USE IN CONSECUTIVE WATER AREAS

Sadao Kojima, Hachioji, Japan, assignor to Kaiyo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 17, 1988, Ser. No. 208,127

Claims priority, application Japan, Jun. 18, 1987, 62-152335

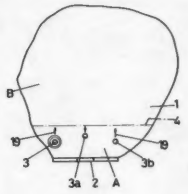
Int. Cl.[4] C02F *7/00*

U.S. Cl. 210—747 **4 Claims**

1. A method of cleaning or purifying water in a large water body, which large water body has a discharge end, by increasing the amount of oxygen dissolved in the water, comprising the steps of:

providing a means for forming a water flow wall for separation of the water across at least a part of the depth and along a line substantially entirely across the large water body near the discharge end for delimiting by said line a part of the large water body as a local water purifying area separate from the remainder of the large water body and separating said delimited part from the rest of the large water body for preventing the water near the surface of said local water purifying area from flowing out of the local water purifying area into the rest of the large water body; and

providing in the local water purifying area a plurality of



apparatuses at predetermined spaced intervals in said local water purifying area for producing a vertical water circulation in the local water purifying area between the surface and the bottom thereof, each apparatus supplying individually formed air bubble masses at regular intervals through a vertical water diffuser tube, said air bubble masses being followed by water being drawn under the action of the air bubble masses to produce jets of water for causing the vertical water circulation.

4,879,047

EFFLUENT TREATMENT

Samuel D. Jackson, Darlington, England, assignor to Imperial Chemical Industries, PLC, London, England

Filed Jan. 11, 1988, Ser. No. 141,942

Claims priority, application United Kingdom, Jan. 22, 1987, 8701397

Int. Cl.[4] C02F *1/58*

U.S. Cl. 210—756 **5 Claims**

1. A process for treating an effluent containing at least one oxidizing agent selected from the group consisting or hypohalite ions, periodate ions, and hydrogen perioxide which comprises decomposing said oxidizing agent by contacting said effluent with a bed of catalyst, said catalyst being free of resin binders and comprising an intimate mixture of:

(i) at least one finely divided oxide of an element of Group IIA of the Periodic Table, and

(ii) at least one finely divided material selected from nickel oxide and hydrates thereof, supported on pieces of a non-porous substantially inert material selected from the group consisting of alumina and magnesia, said Group IIA oxide constituting 0.5 to 50% by weight of said intimate mixture (with the components thereof being expressed as the anhydrous divalent oxides).

4,879,048

METHOD AND FACILITY FOR REMOVING SLUDGE FROM WATER

Heiner Kreyenberg, Waldseestr. 31, 4030 Ratingen 4, Fed. Rep. of Germany

Filed Sep. 16, 1987, Ser. No. 97,629

Claims priority, application European Pat. Off., Mar. 19, 1987, 87104058.0

The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.

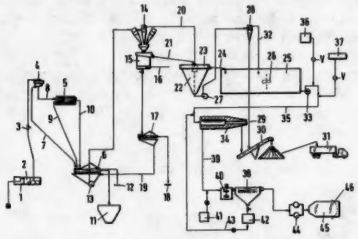
Int. Cl.[4] E01D *1/038*

U.S. Cl. 210—768 **7 Claims**

1. A method of removing from a body of water sludge that contains water, inorganic constituents, and organic constituents with which a problem arises as to what to do with this

matter of constituents after removal thereof from the water since dumps are becoming more scarce so that this problem is met in such a way that the rest of the constituents of the sludge can be provided for subsequent use as economical material, said method including steps of separating the inorganic constituents in the sludge, comprising stones, gravel and sand, from the organic constituents thereof, comprising wood and roots, said method further further comprising: minimizing the volume of said sludge to be disposed in said dumps by effecting in sequence the steps of:

recovering said inorganic constituents for economic use by providing a sorter in a first stage and separating out from said sludge those constituents that are larger than a given size, with inorganic and organic ones of these larger constituents being separated from one another, cleaning these larger constituents, and providing them for subsequent use



as economically usable material to avoid the problem of placement thereof in dumps;

recovering said organic constituents by providing a cyclone unit in a second stage and separating out from the remaining matter inorganic constituents that are larger than a minimum size, cleaning these constituents, and providing them for subsequent use also as economically usable material to avoid the problem of placement thereof in dumps, whereby from the further remaining matter an inorganic and organic slurry is obtained directly during said second stage;

providing a thickener, disposed downstream of said cyclone unit, for thickening said inorganic and organic slurry obtained during said second stage; and

further depositing the thickened portions of said slurry in at least one of said dumps.

4,879,049

METHOD OF REMOVAL OF POLYCYCLIC AROMATIC HYDROCARBONS FROM A LLIQUID

Bob De Mon, Alkmaar, and Antonius I. Van Hoorn, Koedijk, both of Netherlands, assignors to Hoogovens Groep B.V., IJmuiden, Netherlands

Filed Nov. 30, 1987, Ser. No. 126,356

Claims priority, application Netherlands, Dec. 8, 1986, 8603107

Int. Cl.[4] B01D *37/02*

U.S. Cl. 210—777 **6 Claims**

1. Method of removal of polycyclic aromatic hydrocarbons (PAH) from a liquid by subjecting the liquid to precoat vacuum filtration in order to remove from the liquid at least one of solid particles which carry PAH and a second liquid phase which contains PAH, said precoat vacuum filtration comprising the steps of

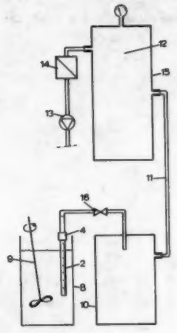
(i) providing a rotary vacuum filter having a rotatable vacuum filter drum having a rotation axis and a diameter and with respect to said axis a peripheral filtering surface which defines the interior of the drum,

(ii) applying to the exterior side of said peripheral filter of the drum a particulate precoat comprising finely divided organic particles in the form of particulate material which in a method of testing applied before the material is applied to the drum in order to determine its suitability for use as precoat material in precoat vacuum filtration, said precoat material had a layer thickness in the range of 30–200 mm, said method of testing comprises the steps of

(a) preparing a uniform slurry of the organic particles;

(b) passing the slurry upwardly through a filter for a predetermined time using a predetermined substantially constant reduced pressure on the downstream side of the filter;

(c) measuring the thickness of the layer of the organic material thus formed against the filter;



(iii) filtering said liquid through said filter drum with said precoat thereon to the interior of the drum, by partially immersing the drum rotating about said axis, in liquid and applying reduced pressure at the interior of the drum, the immersion depth of the drum during the filtering being more than 40% of the drum diameter,

(iv) continuously or intermittently removing a surface layer of the precoat at the exterior of the precoat thereby to present, to subsequently filtered liquid, fresh particles of the precoat at the exterior of the precoat, said organic material consists of wood flour, originating from at least one of the rough pine (Pinus Sylvestris) and the beech (Fagus Sylvatica).

4,879,050

METHOD FOR FIRE EXTINGUISHMENT OF CHLOROSILANES

Hisayoshi Yamaguchi, Tokyo; Tamotsu Yanagisawa, Niigata; Masao Yabuzuka, Gunma; Masakatu Shimizu, and Takashi Tanaka, both of Niigata, all of Japan, assignors to Co., Ltd. Shin-Etsu-Handota, Tokyo, Japan

Filed Oct. 5, 1988, Ser. No. 253,705

Claims priority, application Japan, Oct. 6, 1987, 62-252211

Int. Cl.[4] C09K *21/00*

U.S. Cl. 252—2 **5 Claims**

1. A method for extinguishing fire of a chlorosilane compound which comprises the successive steps of:

(a) sprinkling, over the burning site of the chlorosilane compound, an inert inorganic powder composed of porous particles having a particle diameter in the range from 5 μm to 5 mm, pore diameter in the range from 0.1 to 100 μm, true density in the range from 2.1 to 2.5 g/cm^3 and bulk density in the range from 0.2 to 0.7 g/cm^3 and containing at least 80% by weight of silicon dioxide SiO_2 or at least 90% by weight as a total amount of silicon dioxide as SiO_2 and aluminum oxide as Al_2O_3; and

(b) spraying, over the layer of the inert inorganic powder covering the burning site of the chlorosilane compound, an aqueous solution of a salt selected from the group

consisting of sodium chloride, potassium chloride and calcium chloride.

4,879,051

METHOD OF BOOSTING FOAM IN LOW SUDSING DETERGENTS WITH ZWITTERIONIC POLYSILOXANE

Sunny J. Lo, Sussex, England, and Steven A. Snow, Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Aug. 8, 1988, Ser. No. 229,690
Int. Cl.[4] C11D *17/00;* B01F *17/00;* C08G *77/38;* C07F *7/10*
U.S. Cl. 252—8.75 12 Claims

1. A method of boosting foam in a low sudsing detergent system which contains cationic or nonionic fabric softening surfactants in a textile wash liquor comprising adding to the wash liquor in addition to the detergent an organosulfobetaine zwitterionic siloxane based compound having the general formula selected from the group consisting of:

$$Me_3SiO(SiMeR^1O)_ySiMe_3$$

and

$$Me_3SiO(SiMe_2O)_x(SiMeR^1O)_ySiMe_3$$

wherein:

Me=methyl;

R^1=$-CH_2CH_2CH_2N^+(R^2)_2(CH_2)_zSO_3^-$, or $-CH_2CH_2CH_2N^+(R^2)_2(CH_2)_zCOO^-$;

R^2=an alkyl group having from one to six carbon atoms or $(CH_2)_mOH$;

m=1–6;

x=1–10;

y=1–3; and

z=1–4,

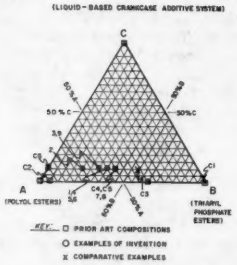
and mixing the detergent and the siloxane compound in the wash liquor along with the textiles.

4,879,052

HIGH TEMPERATURE POLYOL ESTER/PHOSPHATE ESTER CRANKCASE LUBRICANT COMPOSITION

Geralyn Mullin, Yonkers, N.Y., assignor to Akzo America Inc., New York, N.Y.

Continuation of Ser. No. 122,476, Nov. 5, 1987, Pat. No. 4,780,229. This application Aug. 19, 1988, Ser. No. 233,773
Int. Cl.[4] C10M *137/04*
U.S. Cl. 252—32.5 3 Claims



1. A process for improving the frictional characteristics and brake specific fuel consumption of an engine operated at temperatures in excess of 1000° F., which comprises the step of lubricating the engine's moving parts with a composition comprising a blend of at least one polyol ester and at least one triaryl phosphate ester in a combined amount of at least 80 weight percent.

4,879,053

PROCESS FOR PREPARING OVERBASED CALCIUM SULFONATES

Leonard A. Matthews; William J. Powers, III, both of Port Arthur, Tex.; Henry M. Przybyla; Joanne R. Whittle, both of, Los Angeles, Calif., and Jerry C. Perciful, St. Genese, Belgium, assignors to Texaco Inc., White Plains, N.Y.

Filed Jul. 11, 1988, Ser. No. 217,540
Int. Cl.[4] C10M *135/10*
U.S. Cl. 252—25 7 Claims

1. A process for preparing an overbased calcium sulfonate comprising the steps of:

(a) diluting a neutral, calcium sulfonate with a light hydrocarbon solvent and a lower alkanol, said calcium sulfonate derived from sulfonating a naturally occurring or synthetic alkylaryl with oleum or sulfur trioxide and recovering chloride free sulfonate;

(b) mixing calcium oxide and 0.1 to 1 wt % of a promoter selected from the group consisting of alkali halides and alkaline earth halides with the diluted calcium sulfonate;

(c) heating the resulting mixture to about 100° F. to 170° F. at a pressure of about 1 to 5 atm;

(d) introducing into the heated mixture, gaseous carbon dioxide in an amount sufficient to provide a molar ratio of CO_2/calcium oxide of about 0.1 to 1.2;

(e) adding a diluent oil;

(f) separating solids from the liquid; and

(g) stripping the solvent from the resulting liquid product.

4,879,054

PROCESS FOR PRODUCING LOW TEMPERATURE HIGH PERFORMANCE GREASE

John A. Waynick, Bolingbrook, Ill., assignor to Amoco Corporation, Chicago, Ill.

Filed Feb. 29, 1988, Ser. No. 162,045
Int. Cl.[4] C10M *111/02*
U.S. Cl. 252—41 6 Claims

1. A process for producing grease, comprising the steps of:

forming lithium 12-hydroxystearate grease concentrate in polyalphaolefin in the absence of mineral oil by

adding a 12-hydroxystearic compound to polyalphaolefin, said 12-hydroxystearic compound being selected from the group consisting of 12-hydroxystearic acid or methyl 12-hydroxystearate,

subsequently adding at least a chemically equivalent amount of lithium hydroxide monohydrate to said 12-hydroxystearic compound and said polyalphaolefin,

reacting substantially all of said 12-hydroxystearic compound with said lithium hydroxide monohydrate in said polyalphaolefin, in the presence of water, while

concurrently mixing and heating said polyalphaolefin, 12-hydroxystearic compound, and lithium hydroxide monohydrate to a temperature ranging above about +180° F. to less than +400° F. to provide lithium 12-hydroxystearate soap thickener in said polyalphaolefin thereby providing lithium 12-hydroxystearate grease concentrate in polyalphaolefin;

substantially drying said lithium 12-hydroxystearate grease concentrate in polyalphaolefin by vaporizing and removing volatile by-products of reaction, said volatile by-products of reaction selected from the group consisting of water, methyl alcohol, and combinations thereof;

cooling said dried lithium 12-hydroxystearate grease concentrate in polyalphaolefin to a temperature at least about +270° F. to substantially minimize transesterification; thereafter

blending an aliphatic diester of an aliphatic dicarboxylic acid with said 12-hydroxystearate grease concentrate in polyalphaolefin, said aliphatic diester of said aliphatic dicarboxylic acid comprising at least one member selected from the group consisting of di-2-ethyl hexyl azelate, di-isodecyl azelate, di-tridecyl azelate, di-isodecyl adipate, and di-tridecyl adipate;

said aliphatic diester being blended with said grease concentrate in said polyalphaolefin after said volatile by-products of reaction have been vented to substantially prevent hydrolytic cleavage of said aliphatic diester;

cooling said blend of aliphatic diester and said 12-hydroxystearate grease concentrate in polyalphaolefin to a temperature ranging from about +200° F. to about 250° F.; and thereafter

admixing additives with said blend of diester and grease concentrate in polyalphaolefin to substantially impart extreme pressure antiwear properties to the grease and substantially inhibit corrosion of copper and iron, said additives comprising at least one dithiocarbamate-containing compound, a phosphate-containing compound, a corrosion inhibitor, an oxidation inhibitor, and a metal deactivator; and

said blend of aliphatic diester, lithium 12-hydroxystearate grease concentrate in polyalphaolefin with said additives forming a grease with enhanced extreme temperature performance and lubricity qualities at temperatures as low as at least about −100° F. and as high as at least about +250° F.

4,879,055

SOFT MAGNETIC MATERIAL COMPOSITION AND MOLDING PROCESS THEREFOR

Koji Sezaki; Koichi Nagai, and Takashi Sakauchi, all of Ohtsu, Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

PCT No. PCT/JP86/00189, § 371 Date Feb. 12, 1987, § 102(e) Date Feb. 12, 1987, PCT Pub. No. WO86/06541, PCT Pub. Date Nov. 6, 1986

Continuation of Ser. No. 934,633, Feb. 12, 1987, abandoned. This PCT application Apr. 16, 1986, Ser. No. 298,226

Claims priority, application Japan, Apr. 19, 1985, 60-85110

Int. Cl.[4] C04B *35/04;* **H01F** *1/00, 1/26*

U.S. Cl. 252—62.54 **4 Claims**

1. A soft magnetic material composition consisting essentially of 70 to 95 vol% of particles of spinel ferrite powder, wherein the particles of spinel ferrite powder have a diameter of at least 0.1 mm, and a fraction of said particles have a diameter of at least 0.6 mm, the balance of said composition being a liquid thermosetting resin containing 5 to 100 parts by weight of a plasticizer based on 100 parts by weight of solids of the liquid thermosetting resin.

4,879,056

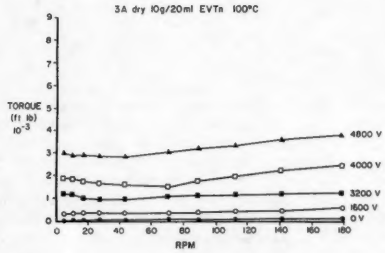
ELECTRIC FIELD DEPENDENT FLUIDS

Frank E. Filisko, and William F. Armstrong, both of Ann Arbor, Mich., assignors to Board of Regents Acting for and on Behalf of University of Michigan, Ann Arbor, Mich.

Continuation-in-part of Ser. No. 922,003, Oct. 22, 1986, Pat. No. 4,744,914. This application Oct. 21, 1987, Ser. No. 111,938

Int. Cl.[4] H01B *3/20*

U.S. Cl. 252—74 **16 Claims**



1. A method of inducing a change in dynamic torque transmission of an electrorheological fluid in response to an electric field at low current comprising the steps of:

(a) selecting a nonconductive liquid phase;

(b) dispersing in said nonconductive liquid phase a particulate phase substantially free of adsorbed water, thus producing an electrorheological fluid; and

(c) subjecting said electrorheological fluid prepared in step (b) to an electric potential in excess of about one kilovolt at a current density of less than about ½ microamp per square inch.

4,879,057

AQUEOUS BLEACHING AGENT SUSPENSIONS CONTAINING PEROXYCARBOXYLIC ACID, METHOD FOR THEIR PREPARATION AND USE

Manfred Dankowski, Mömbris; Thomas Lieser, Hanau; Günter Prescher, Hanau; Wolfgang Leonhardt, and Manfred Diehl, both of Frankfurt, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt/Main, Fed. Rep. of Germany

Filed Mar. 16, 1988, Ser. No. 168,997

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1987, 3709348

Int. Cl.[4] C11D *7/18, 7/38, 7/56*

U.S. Cl. 252—99 **22 Claims**

1. A storage-resistant, pourable to pasty aqueous bleaching agent suspension having a pH between approximately 1 and approximately 6 comprising an aqueous carrier liquid, a particulate, substantially water-insoluble peroxycarboxylic acid, an organic thickening agent, an acidifying agent and a hydrate-forming neutral salt which densensitizes peroxycarboxylic acids, the thickening agent comprising a xanthan polysaccharide or agar polysaccharide.

4,879,058

DETERGENT COMPOSITIONS COMPRISING SYNTHETIC ALKALI METAL ALUMINOSILICATES

Satish K. Wason, Macon, Ga., assignor to J. M. Huber Corporation, Rumson, N.J.

Division of Ser. No. 116,805, Nov. 3, 1987, Pat. No. 4,812,299, which is a continuation-in-part of Ser. No. 875,120, Jun. 17, 1986, abandoned. This application Jan. 19, 1989, Ser. No. 299,293

Int. Cl.[4] C11D *3/12*

U.S. Cl. 252—174.25 **9 Claims**

1. A detergent composition which contains a surfactant ingredient, an alkali metal alumino-silicate having a composition in terms of mole ratio of oxides as follows:

$$xM_2O:Al_2O_3:ySiO_2:zH_2O$$

wherein x is the number of moles of alkali metal oxide and is an integer of 0.01 to 2.0, M is an alkali metal, y is the number of moles of SiO_2 associated with the compositions and is an integer of 2.0 to 20.0, and z is the number of moles of bound water and is an integer of 1.0 to 5.0, wherein primary particles of said alkali metal alumino-silicate comprise a core of clay platelets having an integral adjacent area of essentially amorphous alkali metal silicate base-kaolin clay reaction product.

4,879,059

LIQUID CRYSTAL DEVICE

Yukio Hanyu, Yokohama, and Yukiko Futami, Sagamihara, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 31, 1987, Ser. No. 91,105

Claims priority, application Japan, Sep. 2, 1986, 61-207012; Aug. 6, 1987, 62-197827

Int. Cl.[4] G02F *1/13;* **C09K** *19/56*

U.S. Cl. 252—299.4 **23 Claims**

1. A ferroelectric liquid crystal device comprising a pair oof

sustrates an aligment control film of an aliphatic polyimide derived from a (i) tetracarboxylic acid or dianhydride and (ii) a diamine, at least one of which is aliphatic and a ferroelectric liquid crystal disposed between the pair of substrates.

4,879,060

2-PHENYLPYRIDINE DERIVATIVES AND LIQUID CRYSTAL COMPOSITIONS INCLUDING SAME

Yoshio Shionozaki; Hiroshi Mukai; Tsuyoshi Obikawa, and Shuhei Yamada, all of Suwa, Japan, assignors to Seiko Epson Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 754,056, Jul. 11, 1985, Pat. No. 4,684,220. This application May 22, 1987, Ser. No. 68,996

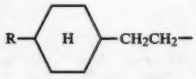
Claims priority, application Japan, Jul. 12, 1984, 59-144848; Oct. 11, 1984, 59-213073; Mar. 27, 1985, 60-62553

Int. Cl.[4] G02F *1/13;* **C09K** *19/34;* **C07D** *239/02, 239/72, 241/46*

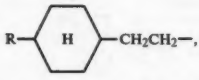
U.S. Cl. 252—299.61 **11 Claims**

1. 2-phenylpyridine derivatives represented by the general formula:

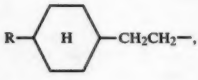
wherein one of Y and Z is



and when Y is



Z is one of R— and —CN; and when Z is



Y is one of —R or —CN; and R is a straight chain alkyl group from 1 to 12 carbon atoms.

4,879,061

LIQUID CRYSTALLINE MATERIALS AND METHOD OF MAKING SAME

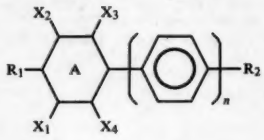
Joseph P. Ferrato, and Julie C. Ferrato, both of Akron, Ohio, assignors to Crystaloid Electronics Co., Hudson, Ohio

Filed Sep. 29, 1986, Ser. No. 912,918

Int. Cl.[4] C02F *1/13;* **C09E** *19/30;* **C07C** *121.60, 121/48, 13/28, 49/313, 49/702*

U.S. Cl. 252—299.62 **13 Claims**

1. A liquid crystalline compound having the formula:



where A designates a cyclohexane ring, n has values of 1, 2 or 3, R_1 is an alkyl radical, R_2 is an alkyl, alkoxy, or alkylcyclohexyl radical or cyanide with at least one of the X_1, X_2, X_3 and X_4 groups being selected from the class of alkyl, halide and cyanide and the rest of the X_1, X_2, X_3 and X_4 groups are selected from hydrogen.

4,879,062

PREPARATION OF A GEL HAVING GAS TRANSPORTING CAPABILITY

Robert E. Moore, Wilmington, Del., assignor to Adamantech, Inc., Linwood, Pa.

Continuation of Ser. No. 313,124, Oct. 20, 1981, Pat. No. 4,569,784, which is a continuation-in-part of Ser. No. 209,238, Nov. 17, 1980, abandoned. This application Sep. 19, 1985, Ser. No. 777,798

The portion of the term of this patent subsequent to Feb. 11, 2003, has been disclaimed.

Int. Cl.[4] B01J *13/00*

U.S. Cl. 252—315.1 **1 Claim**

1. A method for preparing a gel, comprising:

(a) admixing an inert, water-immiscible organic liquid having gas transporting capability, water, and an emulsifying agent under condition of agitation and in proportions effective to form an emulsion; and

(b) concentrating the emulsion to form a gel phase and a liquid phase.

4,879,063

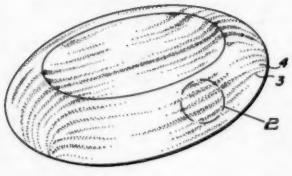
PROCESS FOR MAKING TRANSLUCENT SOAP BARS

Julianne C. Wood-Rethwill, Phoenix; Robert J. Jaworski, Scottsdale; E. Gary Myers, and Michael L. Marshall, both of Scottsdale, all of Ariz., assignors to The Dial Corporation, Phoenix, Ariz.

Filed Jun. 5, 1987, Ser. No. 58,923

Int. Cl.[4] C11D *13/18, 13/04, 17/00*

U.S. Cl. 252—370 **10 Claims**



1. In a process for the production of translucent soap wherein a blend of tallow fat and coconut oil or other fats and oils useful in the production of soap or the corresponding fatty acids derived therefrom are saponified or neutralized, with the resulting neat soap being dried, amalgamated, refined and formed in bars, the improvement comprising:

conducting the saponification or neutralization with a mixture of from about 90–95% sodium hydroxide and from about 5–10% of potassium hydroxide, adding to the resulting neat soap from about 0.8 to about 2.1% of glycerin, from about 1.2 to about 2.0% of a superfatting agent and from about 0 to about 1.2% of a polyethylene glycol

having a molecular weight of about 600, the foregoing percentages being based on the weight of the neat soap, drying said neat soap to a moisture level of from about 14% to about 18%, thereafter passing the dried soap through a refining plodder provided with a screen having hole sizes no greater than 0.8 mm., subjecting the refined soap to amalgamation where a non-aqueous slurry containing polyethylene glycol having an average molecular weight of about 600 and additional glycerin is added to and mixed with said soap, the amount of said polyethylene glycol added to said soap being from about 2.5 to about 4.5% by weight of said soap including any of said polyethylene glycol that is added to said neat soap, the amount of glycerin so added being at least about 0.5% by weight of said soap with the total amount of glycerin in said soap including that added to the heat soap not exceeding 3.5% of the weight of said soap, subjecting said soap to refining using a screen having openings no greater than about 0.8 mm. and thereafter compacting and extruding said soap in a continuous log which can be cut and stamped into bars.

7. A process for the production of translucent bar soap having a striated pattern comprising saponifying a blend of tallow and coconut fatty acids with an alkali mixture of sodium hydroxide and potassium hydroxide, adding from about 0.8 to about 2.1% glycerin and from about 1.2 to about 2.0% superfatting agent to the resulting neat soap, the foregoing percentages being based on the weight of the neat soap, drying said neat soap to a moisture level of from about 14% to about 18%, subjecting the dried soap to amalgamation wherein a slurry containing polyethylene glycol with an average molecular weight of 600, additional glycerin and a planar reflective material are added to and mixed with said soap, the amount of said polyethylene glycol added to said soap being from about 2.5 to about 4.5% by weight of said soap and the amount of glycerin so added being at least about 0.5% by weight of said soap with the total amount of glycerin in said soap not exceeding 3.5% by weight of said soap, subjecting said soap to refining using a screen having openings no greater than about 0.8 mm., and thereafter compacting and extruding said soap in an extrusion plodder having an extrusion worm mounted to a worm support having openings therein, and a compaction plate mounted adjacent to said support, said compaction plate being provided with a series of openings through which said soap is forced, and wherein the ratio of the total open area of said worm support to the total area of the openings in said compaction plate is from 2:1 to about 3:1.

4,879,064

ELECTROCONDUCTIVE COATING COMPOSITION

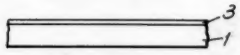
Kelvin P. Adkins, Elmstead Market, England, assignor to Imperial Chemical Industries Plc, London, England

Filed Jun. 30, 1987, Ser. No. 69,701

Claims priority, application United Kingdom, Jul. 2, 1986, 8616186

Int. Cl.⁴ H01B *1/00*

U.S. Cl. 252—500 **6 Claims**



1. An electroconductive composition for coating a plastics substrate wherein the composition comprises a polymeric electrolyte and a polyepoxy resin in a weight ratio from 1:20 to 1:0.5, the polymeric electrolyte being an a cationic electroconductive polymer capable of conducting a current through ionization.

4,879,065

PROCESSES OF MAKING PLASTICS MIXTURES WHICH ABSORB ELECTROMAGNETIC RADIATION AND CONTAIN FERROELECTRIC AND/OR PIEZOELECTRIC SUBSTANCES

Hans-Josef Sterzel, Dannstadt-Schauernheim, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 28,547, Mar. 20, 1987, abandoned. This application Nov. 13, 1987, Ser. No. 120,707

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1986, 3609814

Int. Cl.⁴ G03C *1/03;* H01B *1/06;* G21F *1/10*

U.S. Cl. 252—600 **5 Claims**

1. A process for the preparation of a plastics mixture which absorbs electromagnetic radiation, and which contains:

(A) from 99 to 10% by weight of a heat-stable thermoplastic polymer, and

(B) from 1 to 90% by weight of a ferrite of the formula $MeO.Fe_2O_3$, a titanate of the formula $MeTiO_3$, a zirconate of the formula $MeZrO_3$ or a mixed compound of the formula $Me'_mMe''_n(Ti_xZr_y)O_3$ where $x+y=1$, $m+n=1$ and Me' and Me'' are divalent metal cations, wherein said ferrite, titanate, zirconate or mixed compound has a particle size of from 100 to 5,000Å and is present in a nonagglomerated form dispersed in said thermoplastic polymer,

which process comprises: combining metal components necessary to form said ferrite, titanate, zirconate or mixed compound and in the stoichiometric ratios required to form said ferrite, titanate, zirconate or mixed compound, in the form of organometallic compounds; and mixing said metal components in their organometallic form with the thermoplastic polymer and the amount of water required for hydrolysis; and heating the mixture to above 250° C.

4,879,066

FIRE RETARDANT ADDITIVES AND THEIR USES

Geoffrey Crompton, 55 Arbour Street, Southport, Merseyside, United Kingdom (PR8 6SQ)

Filed Apr. 11, 1988, Ser. No. 179,702

Claims priority, application United Kingdom, Apr. 11, 1987, 8708733; Jul. 7, 1987, 8715929; Sep. 10, 1987, 8721309

Int. Cl.⁴ C09K *21/00;* C09D *5/16, 5/18;* C03C *8/14*

U.S. Cl. 252—606 **17 Claims**

17. A composition for providing or enhancing the fire resistance of a material comprising:

a first frit having a relatively low melting point;

a second frit having a melting point higher than said first frit; and

at least one other frit having a melting point higher than said second frit, at least one of said frits being a devitrifying frit, said frits melting progressively under fire conditions to provide a fused protective layer for said material.

4,879,067

RED PHOSPHORUS FLAME RETARDANT AND NONFLAMMABLE RESINOUS COMPOSITION CONTAINING THE SAME

Ichiro Sakon, Toyama; Masao Sekiguchi, Uozu, and Atsushi Kanayama, Toyama, all of Japan, assignors to Rinkagaku Kogyo Co., Ltd., Shinminato, Japan

Filed Apr. 17, 1987, Ser. No. 40,522

Claims priority, application Japan, Jun. 19, 1986, 61-143714; Oct. 27, 1986, 61-255419

Int. Cl.⁴ C07K *21/00*

U.S. Cl. 252—609 **16 Claims**

9. A flame retardant comprising: spherical particles consisting of red phosphorus and agglomerates of said spherical particles, said spherical particles having particle sizes of not greater than 200 μm and having continuous external surfaces which are substantially free of ridges and active sites formed by pulverizing which would be capable of adsorbing moisture and

oxygen whereby the surfaces of said particles are stable and adsorption of oxygen and moisture and disproportionation do not occur on said surfaces.

4,879,068

PROCESS FOR THE PREPARAITON OF ALKYL FLUORIDES

Dario Chiarino, Via Rivolta, 2, 20052 Monza (Milano); Davide Della Bella, Piazza Leonardo da Vinci, 3, 20133 Milano; Giancarlo Jommi, Via Gozzano, 4, 20131 Milano; Domenico Badone, Via Andreoli, 2, 21056 Induno Olona (Varese); Roberto Pagliarin, Via Zara, 29, 20010 San Giorgio su Legnano (Milano), and Paolo Tavecchia, Via Volta, 10, 20017 Rho (Milano), all of Italy

PCT No. PCT/EP86/00086, § 371 Date Sep. 30, 1986, § 102(e) Date Sep. 30, 1986, PCT Pub. No. WO86/04893, PCT Pub. Date Aug. 28, 1986

PCT Filed Feb. 12, 1986, Ser. No. 928,255

Claims priority, application Italy, Feb. 15, 1985, 19530 A/85

Int. Cl.[4] C07C *17/22, 19/02, 71/24;* C17J *1/00*

U.S. Cl. 260—397 **5 Claims**

1. A process for the preparation of an alkyl fluoride, RF, wherein a sulfonyl derivative of the formula

$$R—O—SO_2—R' \quad (I)$$

wherein R is alkyl, arylalkyl or cycloalkyl and R' is lower alkyl, or aryl, is reacted at 40° to 110° C. with a sodium, potassium, ammonium or phosphonium fluoride in a polyglycol of the formula

$$HO—(AO)_n—H$$

wherein A is a straight or branched alkylene having 2–6 carbon atoms and n is an integer ranging from 4 to 50.

4,879,069

FLUORESCENT CONJUGATED POLYENE STEROL DERIVATIVES AS CELL MEMBRANE PROBES

Peter Morand, 4-274 Daly Avenue, Ottawa, Ontario, Canada (K1N 6G5); Jacinta Drew, Apt. 209-475 Elgin Street, Ottawa, Ontario, Canada (K2P 2E6); Arthur G. Szabo, 21 Beechmont Crescent, Gloucester, Ontario, Canada (K1B 4A7), and Pierre R. Proulx, 57 Rebecca Crescent, Ottawa, Ontario, Canada (K1J 6C2)

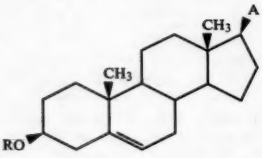
Filed May 28, 1986, Ser. No. 867,565

Claims priority, application Canada, May 31, 1985, 482887

Int. Cl.[4] C07J *9/00*

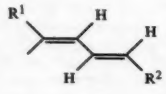
U.S. Cl. 260—397.2 **7 Claims**

1. An olefinic compound of formula I



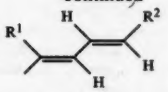
I

wherein R represents hydrogen, formyl, C_2–C_{20} alkylcarbonyl, C_3–C_{20} alkenylcarbonyl, C_3–C_{20} alkynylcarbonyl or arylcarbonyl, and A represents

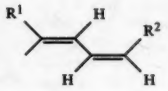


(a)

-continued

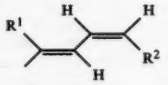


(b)



(c)

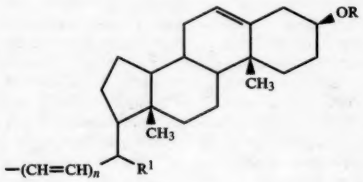
or



(d)

in which R^1 represents H, C_1–C_4 lower alkyl, C_2–C_4 lower alkenyl, C_2–C_4 lower alkynyl phenyl or phenyl substituted by a substituent selected from the group consisting of halo, aryl and lower alkyl and

R^2 represents $—(CH=CH)_n—CH=CH_2$, $—(CH=CH)_n$-phenyl, $—(CH=CH)_n$-naphthyl, $—(CH=CH)_n$-tricyclic aryl, $—(CH=CH)_n$-tetracylic aryl or



in which n is 0 to 3 and R and R^1 are as defined above.

4,879,070

PRODUCTION OF FORMATE SALTS

Alexander G. Kent, North Humberside, England, assignor to BP Chemicals Limited, London, England

Continuation of Ser. No. 946,667, Jan. 5, 1987, abandoned, which is a continuation of Ser. No. 689,826, Jan. 9, 1985, abandoned. This application Apr. 7, 1988, Ser. No. 180,672

Claims priority, application United Kingdom, Jan. 14, 1984, 8401005

The portion of the term of this patent subsequent to Oct. 2, 2001, has been disclaimed.

Int. Cl.[4] C07C *87/08, 87/10, 87/12, 87/123*

U.S. Cl. 562—550 **15 Claims**

1. A process for the production of a formate salt of a nitrogenous base containing a tertiary nitrogen atom which process comprises reacting hydrogen and carbon dioxide with the nitrogenous base containing a tertiary nitrogen atom in the presence of a solvent and an effective amount of a catalyst characterised in that the catalyst comprises an inorganic or organometallic compound of rhodium and an organophosphorus compound.

4,879,071

BORON TRIS-(DIALKYL-DITHIOCARBAMATES) AND A PROCESS FOR THEIR PREPARATION

Wolfram Spiess, and Rolf Himmelreich, both of Grünstadt, Fed. Rep. of Germany, assignors to C.F. Spiess & Sohn GmbH & Co., Kleinkarlback, Fed. Rep. of Germany

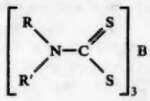
Filed Apr. 26, 1988, Ser. No. 186,337

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1987, 3714260

Int. Cl.[4] C07F *5/02*

U.S. Cl. 562—882 4 Claims

1. A boron tris-(dialkyl-dithiocarbamate) of the formula



(I)

wherein R and R' represents the same or different branched- or straight-chain saturated or unsaturated hydrocarbon groups having from 1 to 16 carbon atoms.

4,879,072

METHOD OF MANUFACTURING NATURAL PROTEIN POLYMER CONTACT LENSES BY MOLDING AND CROSS-LINKING

Claude Bourset, Creteil, and Georges Wajs, Ivry, both of France, assignors to Essilor International Cie Generale d'Optique, Cretiel, France

Filed Jul. 6, 1988, Ser. No. 215,502

Claims priority, application France, Jul. 7, 1987, 87 09619

Int. Cl.[4] B29D *11/00*

U.S. Cl. 264—1.4 11 Claims

1. Method of manufacturing a flexible contact lens from a protein biological material wherein a hydrogel is made by hydrating said protein biological material, a lens preform is then made from said hydrogel at a temperature between ambient temperature and the temperature at which said material liquefies, said preform is then placed in a mold made from a low-loss dielectric material and in at least two parts which, when locked together, define a three-dimensional shape and a finished lens surface state, said hydrogel is then liquefied by irradiating said mold by means of an electromagnetic field at a frequency between 10^8 and 10^{10} Hz, said parts of said mold are then locked together, said hydrogel is then gelified by cooling in said mold and said hydrogel is then cross-linked by contact with a cross-linking agent.

4,879,073

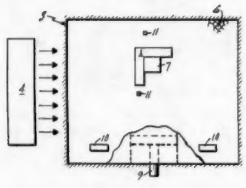
PROCESS OF HIGH PRESSURE CURING WITH ULTRAVIOLET RADIATION

Robert V. Kromrey, Campbell, Calif., assignor to United Technologies Corporation, Hartford, Conn.

Filed Apr. 22, 1988, Ser. No. 184,929

Int. Cl.[4] B29C *35/08, 35/10, 43/10, 43/22*

U.S. Cl. 264—22 9 Claims



1. The method of pressure molding a polymeric containing article from a polymeric containing precursor article comprising

(a) placing the precursor article within a pressure vessel;

(b) substantially filling the vessel with a solid, flowable, polymer medium that is substantially ultraviolet transparent under pressure;

(c) pressurizing said medium so as to produce a substantially uniform, predetermined pressure on the surface of said precursor article; and

(d) passing through said pressurized medium ultraviolet radiation of about 280 nm to about 400 nm in wavelength sufficient to cure said article.

4,879,074

METHOD FOR COATING SOOT ON A MELT CONTACT SURFACE

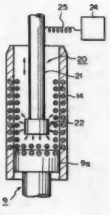
Yoshiharu Waku; Hideho Yoshioka; Hiroyoshi Oba, and Kiyoshi Fujino, all of Ube, Japan, assignors to Ube Industries, Ltd., Yamaguchi, Japan

Filed Nov. 20, 1987, Ser. No. 123,261

Claims priority, application Japan, Nov. 27, 1986, 61-280708; Mar. 13, 1987, 62-56799

Int. Cl.[4] B28B *7/38;* B05D *1/06*

U.S. Cl. 264—24 10 Claims



1. A method of coating soot, employing a gas burning system, on a melt contact surface for use in a casting, comprising: the step of charging the soot and the melt contact surface with opposite electrical polarities to thereby cause an electrodeposition of the charged soot on the melt contact surface;

wherein a combustion gas from which the soot is derived is produced in at least one jet stream directed onto the melt contact surface; and

the melt contact surface is coated with a parting agent prior to being subjected to said electrodeposition of the soot.

5. A method of coating soot on a melt contact surface of a casting apparatus adapted for multiple cycles of injection molding, comprising:

the step of coating soot on the melt contact surface by applying a high voltage between the soot and the melt contact surface to thereby cause an electrodeposition of the soot on the melt contact surface, wherein said step of coating is carried out once in a plurality of injection molding cycles.

4,879,075

EVAPORATIVE AIR COOLING APPARATUS

Robert A. Hinton, 14006 Fairoak Crossing, San Antonio, Tex. 78231-1914

Filed Sep. 13, 1988, Ser. No. 243,622

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—26 3 Claims

1. An evaporative cooler apparatus comprising in combination:

a. An induced draft fan, mounted within the attic of a building or structure to facilitate intake of outside, ambient air through a screened intake vent;

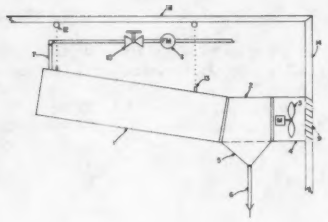
b. An adapter section which receives air from the fan, and provides conduit for the air into the evaporation bundle; and receives excess evaporation water from the evapora-

tion bundle, and provides conduit for said water into a water drain pipe or conduit;

c. An evaporator bundle comprised of concentric elements such as cylinders of fibrous pad media within a containment shell;

d. A means for suspension or support of said evaporation apparatus in an inclined position within the attic space of said structure to provide natural capillary and gravity flow of evaporation water from the higher end of said evaporation bundle to the lower end of said evaporation bundle;

e. A conduit and flow control system to supply evaporation water to said evaporation bundle; said flow control system



including trickle irrigation nozzles which are affixed to the top surface of each evaporation element said irrigation nozzles spaced to provide even distribution of evaporation water throughout the evaporation pads by the action of gravity and capillary flow of said evaporation water;

f. Annular spacers to support the evaporation elements within the containment shell of the evaporation bundle in an array to facilitate equalized air velocity in all annular spaces between the evaporation elements, and facilitating flow of air with minimum resistance;

g. A supporting means, such as a restraining bar, to prevent telescoping movement of the elements of the evaporation bundle.

4,879,076

PROCESS FOR THE PRODUCTION OF POLYETHYLENE MATERIALS

Akira Sano, Kawasaki; Seizo Kobayashi, Yokohama; Kazuo Matsuura, Tokyo; Shigeki Yokoyama, Yokohama, and Takeshi Kamiya, Kamakura, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Filed Jun. 12, 1987, Ser. No. 61,226

Claims priority, application Japan, Jun. 17, 1986, 61-140647; Aug. 7, 1986, 61-185918; Aug. 7, 1986, 61-185919; Sep. 5, 1986, 61-209211

Int. Cl.[4] B29C *35/02;* **B29B** *11/12*

U.S. Cl. 264—28 **10 Claims**

1. A process for producing a polyethylene material of great mechanical strength and high elastic modulus, which comprises;

(a) polymerizing ethylene at a temperature between −20° C. and 110° C. in the presence of a catalyst comprising (1) a solid component containing magnesium and vanadium and (2) an organometallic compound to produce particulate polyethylene having an intrinsic viscosity in the range of from 5 to 50 dl/g at 135° C. in decalin; and

(b) drawing the resulting particulate polyethylene, without melting or dissolution, at a temperature lower than the melting point thereof.

6. A process for producing a polyethylene material of great mechanical strength and high elastic modulus, which comprises;

(a) polymerizing ethylene in a first reaction stage in a reactor at a temperature in the range of from 0° C. to 90° C. in the presence of a catalyst comprising (1) a solid component containing magnesium and titanium and (2) an organometallic compound, in the absence of hydrogen or in the presence of hydrogen at reduced concentration, to from 50–99.5 parts by weight of an ethylene homopolymer having an intrinsic viscosity in the range of from 12 to 50 dl/g at 135° C. in decalin;

(b) introducing a fresh feed of ethylene into said reactor and polymerizing the fresh feed of ethylene in a second reaction stage at a temperature in the range of from 40° C. to 100° C. in the presence of hydrogen at increased concentration to from 50–0.5 parts by weight of an ethylene polymer having an intrinsic viscosity in the range of from 0.1 to 4.9 dl/g at 135° C. in decalin; and

(c) drawing particular polyethylene of ultrahigh molecular weight which results from the above two stages of polymerization, without melting or dissolution, at a temperature lower than the melting point thereof, said particular polyethylene having an intrinsic viscosity in the range of 5 to 50 dl/g at 135° C. in decalin.

4,879,077

CONTROL METHOD OF INJECTION MOLDING MACHINE

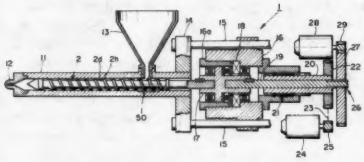
Junichi Shimizu, and Tadashi Nakajoh, both of Nagano, Japan, assignors to Nissei Jushi Kogyo Kabushiki Kaisha, Nagano, Japan

Filed Jul. 8, 1988, Ser. No. 216,503

Claims priority, application Japan, Feb. 29, 1988, 63-46853

Int. Cl.[4] B29C *45/50*

U.S. Cl. 264—40.1 **3 Claims**



1. A control method for an in-line injection molding machine having a screw in a heating cylinder provided with a hopper, the control method comprising the steps of:

feeding material from the hopper to the screw;

rotating the screw in one of a forward and reverse direction;

moving the screw forward and backward in the heating cylinder;

setting a predetermined speed for reverse rotation of the screw during an injection process when the screw is moved forward by the equation:

$$r = Vs/L$$

wherein

r is the predetermined speed,

Vs is a forward speed of the screw, and

L is a pitch of the screw,

detectng an apparent position of a ridge of the screw in an axial direction for a predetermined position of the heating cylinder,

whereby the apparent position of the ridge of the screw remains generally stationary relative to the heating cylinder during forward movement of the screw during the injection process in response to the setting.

4,879,078

PROCESS FOR PRODUCING UNIAXIAL POLYOLEFIN/FILLER FILMS FOR CONTROLLED ATMOSPHERE PACKAGING

Mitchell K. Antoon, Jr., Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Mar. 14, 1988, Ser. No. 167,815
Int. Cl.[4] B29B *9/06*
U.S. Cl. 264—41 **7 Claims**

1. A process for preparing a controlled atmosphere packaging film having a consistent permeance throughout the film and a wide processing window by

(a) melt blending in a vessel in a temperature range of 150°–300° C. the ingredients

(i) 64–84% by volume of a polymer selected from the group of homopolymer, copolymer, or blends thereof of alpha-monoolefins having 2 to 10 carbons, poly(ethylene terephthalate), poly(butylene terephalate), nylon, polystyrene, ethylene-vinyl acetate copolymers, ethylene-methacrylic acid copolymers, ethylene-vinyl alcohol copolymers, and polycarbonate,

(ii) about 15–34% by volume of an inert filler based on the weight of the polymer and filler, said filler having an average particle size of about 0.3 to 8 microns,

(iii) about 0.2–5% by volume of a processing aid selected from calcium stearate, zinc stearate, oleic acid, and stearic acid, and

(iv) 0 to 3% by volume of a stabilizer,

(b) maintaining the moisture level in the melt blend below 700 ppm,

(c) casting a film,

(d) cooling the film to a temperature below the melting point of the film,

(e) uniaxially stretching the film at least two times its original casting dimensions in one direction with the temperature of the film during stretching being within the temperature range which is above the line-drawing temperature and below the melting temperature of the polymer, until the film has a sufficient number of elongated, narrow shaped, microporous voids in order to create a CO_2 and O_2 permeance in the film in the range of 5,000 to 10,000,000 cc/100 in^2-atm-day with a standard deviation of the permeance in the range of less than 35%, and

(f) cooling the film to room temperature.

4,879,079

FORMATION OF LANTHANUM ALUMINATE

Martin Y. Hsieh, Palo Alto, Calif., assignor to GTE Products Corporation, Stamford, Conn.

Filed Jul. 16, 1984, Ser. No. 631,270
Int. Cl.[4] C04B *35/44*
U.S. Cl. 264—56 **8 Claims**

1. In a process for producing silicon nitride bodies wherein a sintering aid is used, the improvement comprising forming said sintering aid by a process comprising:

(a) formimg an admixture of oxides of lanthanum and aluminum in a weight ratio of lanthanum oxide to aluminum oxide of about 12 to 1 to about 1 to 12 and

(b) heating said admixture at a sufficient temperature and for a sufficient time to form a reacted material containing at least some of a lanthanum aluminum compound having an atomic ratio of lanthanum to aluminum of about 1 to 1.

4,879,080

HIGH DENSITY SILICON NITRIDE BODIES

Martin Y. Hsieh, Palo Alto, Calif., assignor to GTE Products Corporation, Stamford, Conn.

Filed May 2, 1984, Ser. No. 606,044
Int. Cl.[4] C04B *35/44*
U.S. Cl. 264—63 **6 Claims**

1. A process for producing silicon nitride bodies of near theoretical density said process comprising:

(a) forming an admixture consisting essentially of silicon nitride and sintering aids selected from the group consisting of lanthanum aluminate, mixtures of lanthanum aluminate and aluminum oxide and mixtures of lanthanum aluminate and lanthanum oxide, and a volatile binder,

(b) pressing said admixture to form a green silicon nitride body and,

(c) sintering said green silicon nitride body to produce a silicon nitride body having a density of greater than about 96% of the theoretical density.

4,879,081

PROCESS OF MAKING FUSED, ORIENTED-GRAIN POLYMERIC MATERIALS

Gerald T. Keep, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 15, 1988, Ser. No. 219,629
Int. Cl.[4] B29C *67/04*
U.S. Cl. 264—101 **8 Claims**

1. A process for producing a fused thermoplastic material, comprising the steps of:

(i) molecularly orienting a thermoplastic material;

(ii) grinding said oriented material to produce a ground particulate material having a particle size between about 0.01 to 10 mm; and

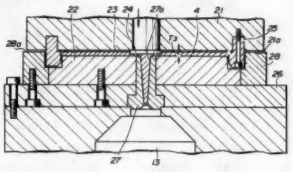
(iii) fusing said ground particulate material at a temperature sufficient to substantially mutually adhere said particles, but low enough to prevent loss of orientation of said thermoplastic material, thereby producing said thermoplastic material.

4,879,082

METHOD FOR MOLDING PLASTIC MATERIAL INTO DISK SHAPED SABSTRATE FOR AN OPTICAL INFORMATION RECORD CARRIER

Junichiro Kudo, and Yoshihiro Shimizu, both of Miyagi, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 27, 1987, Ser. No. 126,043
Claims priority, application Japan, Nov. 28, 1986, 61-283615
Int. Cl.[4] B29D *11/00*
U.S. Cl. 264—106 **5 Claims**



1. A method for molding plastic material into a disk shaped substrate for an optical information record carrier comprising the steps of,

injecting molten polycarbonate resin into a cavity defined by a stationary mold and a movable mold under application of mold clamp pressure between said molds,

releasing said mold clamp pressure at a predetermined time after injection of said molten resin is completed and said molten resin is partially solidified, whereby a predetermined double refraction characteristic is obtained for said substrate,

holding said resin in said molds under the released mold clamp pressure condition until said resin is solidified, and taking out the molded resin from said mold.

4,879,083

CHEMICALLY TREATED WOOD PARTICLE BOARD

Robert M. Knudson, and Marek J. Gnatowski, both of Coquitlam, Canada, assignors to MacMillan Bloedel Limited, Canada

Filed Jun. 17, 1988, Ser. No. 207,955
Int. Cl.[4] B29C *43/02*
U.S. Cl. 264—122 8 Claims

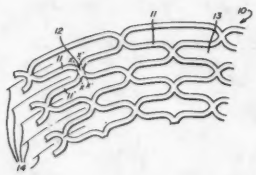
1. A method of making a chemically treated, consolidated wood product from wood particles comprising applying a phenol formaldehyde resin and at least one particulate boron compound selected from the group consisting of anhydrous borax and zinc borate having a particle size of less than 30 mesh to substantially uniformly distribute particles of said particulate boron compound on the surface of the wood particles and produce treated wood particles, laying said treated wood particles into a mat, consolidating said mat under heat and pressure to consolidate said treated wood particles into said consolidated wood product having an internal bond equivalent to the internal bond of a similar consolidated wood product not containing said boron compound.

4,879,084

METHOD OF FORMING A NET-LIKE STRUCTURE

Rudolf Parnigoni, 62, Boul. Du Domaine, Ile Perrot, Quebec, Canada J7V 5V6

Continuation-in-part of Ser. No. 357,721, Mar. 12, 1982, abandoned, which is a continuation-in-part of Ser. No. 250,863, Apr. 3, 1981, abandoned. This application Sep. 19, 1983, Ser. No. 533,789
Int. Cl.[4] B29C *53/04;* B21D *31/04*
U.S. Cl. 264—295 15 Claims



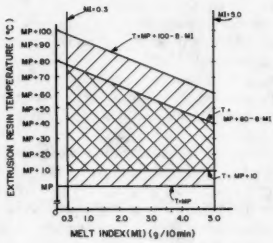
1. A method of forming a three-dimensional structure comprising the steps of casting a substantially planar web from a suitable material in the plastic state, the planar web being initially cast with an expandable pattern of a plurality of non-bendable, rigid strands merging at strand joints and defining openings therebetween, the planar web including a central portion and exterior portion surrounding the pattern of strands and the central portion, selecting points on the strands near or on the strand joints, a bending axis passing through each of said points, weakening the strands in the intermediate area of the selected points to form hinges in order to permit the strands to bend about the bending axes, and expanding the structure by forcing the central portion and the exterior portions in opposite directions perpendicular to the plane of the planar web, the bending of the strands occurring about their respective bending axes at the hinges, the expansion of the structure occurring without changing the dimensions of the strands and strand joints from the dimensions thereof in the planar web, whereby a rigid, three dimensional structure with structural integrity is formed.

4,879,085

METHOD OF MANUFACTURING POLYACETAL RESIN FILM

Kotaro Taniguchi, Nagaokakyo; Toshio Konishi, Sakai; Takehiko Shimura, Nara; Shigekazu Tanimoto, and Shigeru Nedzu, both of Fuji, all of Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

Filed Apr. 1, 1988, Ser. No. 176,820
Claims priority, application Japan, Apr. 1, 1987, 62-80096; Jun. 22, 1987, 62-155057
Int. Cl.[4] B29C *49/04, 49/08;* C08G *2/00, 6/00*
U.S. Cl. 264—564 5 Claims



1. A method of manufacturing a polyacetal resin film comprising forming a polyacetal resin having a melt index of between 0.3 to 5.0 into a film by an inflation process within an extrusion resin temperature range according to the following equation:

melting point (°C.) < extrusion resin temperature (°C.) ≦

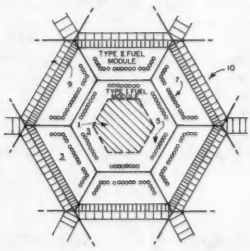
melting point + 100 − 8 · melt index (°C.).

4,879,086

NEUTRON ECONOMIC REACTIVITY CONTROL SYSTEM FOR LIGHT WATER REACTORS

Robert G. Luce, Glenville; Daniel F. McCoy, Latham; Floyd C. Merriman, Rotterdam, and Steve Gregurech, Scotia, all of N.Y., assignors to The United States of America as represented by The United States Department of Energy, Washington, D.C.

Filed Sep. 27, 1988, Ser. No. 250,040
Int. Cl.[4] G21C *1/00*
U.S. Cl. 376—173 1 Claim



1. The combination of a neutron reactivity control system and a light water pre-breeder/breeder reactor comprising:

a reactor core having a stationary seed-blanket arrangement of a plurality of symmetrical, contiguous hexagonal shaped physics cell regions, each of said cell regions comprising:

a hexagonal shaped inner fuel module including a hexagonal shaped inner blanket region of stationary blanket fuel rods containing thoria fuel pellets, said inner blanket region centrally positioned in said inner fuel module, and a hexagonal shaped, annular first seed region which surrounds said inner blanket region and which includes stationary seed fuel rods having a mixture of thoria and urania fuel pellets and the combination of a neutron reactivity control system and a light water pre-breeder/breeder reactor comprising: movable poison rods of neutron absorption materials which are used to shut down and control the reactor core and which are symmetrically arranged about said inner blanket region; and

a hexagonal shaped, annular outer fuel module which is contigious to and arranged symmetrically about said first seed region of said inner fuel module, said outer fuel module including an outer annular periphal blanket region of stationary blanket fuel rods containing thoria fuel pellets which defines the outer periphery of said physics cell and an annular second seed region which is contiguous with and which surrounds said inner fuel module, said second seed region including stationary seed fuel rods having a mixture of thoria and urania fuel pellets, and a plurality of movable shim control rods containing thoria materials for controlling the reactivity of the reactor core.

4,879,087

NUCLEAR POWER PLANT

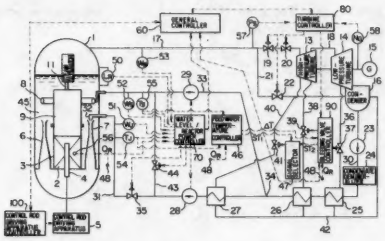
Takao Akiyama; Tetsuo Ito, both of Hitachi, and Isao Sumida, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 4, 1988, Ser. No. 152,380

Claims priority, application Japan, Feb. 4, 1987, 62-22357

Int. Cl.[4] G21C *7/36*

U.S. Cl. 376—216 **17 Claims**



16. A nuclear power plant comprising:

a reactor container incorporating a core;

a jet pump disposed in said reactor container and adapted to supply a coolant to said core;

a feed water sparger]provided in said reactor container;

a first pipeline for introducing feed water into said jet pump as driving water;

a second pipeline connected to said first pipeline and adapted to introduce said feed water into said feed water sparger;

a first feed water heater disposed at a portion of said first pipeline upstream of a connecting point between said first pipeline and said second pipeline;

a second feed water heater disposed at a portion of said first pipeline downstream of said connecting point;

a turbine driven by steam discharged from said reactor container;

a bleeding pipeline provided with a flow-rate adjusting valve and adapted to introduce said steam into said first feed water heater;

means for detecting a rotational speed of said turbine;

means for extracting from an output of said rotational speed detecting means a component of variation falling within a predetermined period and predetermined amplitude; and

means for controlling an amount of opening of said flow-rate adjusting valve on the basis of said component of variation extracted.

4,879,088

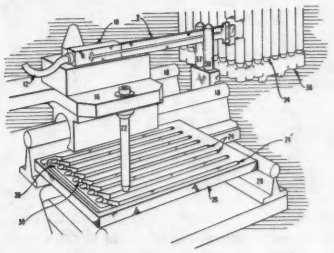
METHOD AND APPARATUS FOR DETECTING FAILED FUEL RODS (ENC-189)

Leo F. van Swam, Richland; Thomas R. Blair, Kennewick, and Quang D. Ho, West Richmond, all of Wash., assignors to Advanced Nuclear Fuels Corporation, Bellevue, Wash.

Continuation-in-part of Ser. No. 65,185, Jun. 17, 1987, abandoned, which is a continuation of Ser. No. 660,786, Oct. 15, 1984, abandoned. This application Mar. 8, 1988, Ser. No. 165,681

Int. Cl.[4] G21C *17/06*

U.S. Cl. 376—252 **5 Claims**



1. A method of distinguishing nuclear fuel rods containing water from rods free from water, such rods being arranged in an assembly in straight spaced rows, comprising moving a single ultrasonic transducer parallel to one of said rows, but spaced from the fuel rods in said row, and emitting bursts of ultrasound in the direction of said rods and at right angles to their axes; upon reception of an initial echo from a rod, recording said echo on a recording medium and, after a predetermined length of time and for a limited period of time, corresponding to echoing entirely within the cladding wall, recording reception of a second repetitive echo greater than a predetermined threshold, said second echo resulting from echoing back and forth between the outer surface and the inner surface of the cladding of said rod nearest to the transducer, the absence of said second echo above said threshold indicating the presence of water.

4,879,089

LIQUID METAL COOLED NUCLEAR REACTORS

Gordon Kenworthy, Leigh; Colin H. Mitchell, Knutsford, and Keith S. Hawkins, Wirral, all of England, assignors to National Nuclear Corporation Ltd., Knutsford, England

Filed Jan. 21, 1987, Ser. No. 5,653

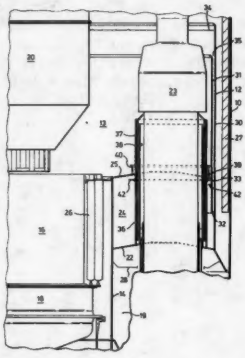
Claims priority, application United Kingdom, Feb. 12, 1986, 8603398

Int. Cl.[4] G21C *13/04*

U.S. Cl. 376—399 **16 Claims**

1. A liquid metal cooled nuclear reactor, of the kind in which the liquid metal coolant is circulated from a relatively cool region (herein called the cold pool) of the reactor primary vessel through the reactor core where the coolant is in heat exchange relationship with nuclear fuel and emerges at a higher temperature in a higher region (herein called the hot pool) of the reactor vessel, the coolant then being returned from the hot pool to the cold pool via heat exchangers which serve to extract heat from the hot coolant for conversion to other forms of energy, the reactor having an intermediate plenum encircling the reactor core to provide a thermal barrier between the hot and cold pools of the reactor, characterised by means intercommunicating an upper part of the intermediate

plenum and the hot pool superimposed in relation thereto to establish therebetween a permanently open, convectively acting communication capable of allowing rapid interchange of coolant convectively and unforced between the intermediate plenum and the hot pool in response to rapid temperature reduction in the hot pool and in a sufficient amount so as to



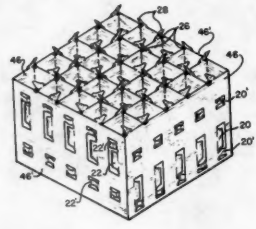
avoid substantial temperature differentials which would otherwise occur between the upper part of the intermediate plenum and the hot pool but incapable of allowing, when the reactor is in a steady state condition, any more than a substantially smaller interchange to occur such as will not materially affect the thermal barrier function of said intermediate plenum.

4,879,090

SPLIT VANED NUCLEAR FUEL ASSEMBLY GRID

Patrick A. Perrotti, Newington; Paul F. Joffre, Colchester; Zeses E. Karoutas, Simsbury; Lawrence V. Corsetti, Granby; William J. Bryan, Granby, and Stephen C. Hatfield, Granby, all of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Aug. 24, 1987, Ser. No. 88,439
Int. Cl.[4] G21C *3/18*
U.S. Cl. 376—462 **4 Claims**



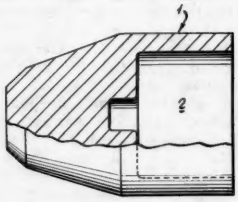
1. In a fuel element grid including integral springs for supporting a plurality of nuclear fuel elements intermediate their ends in spaced relation for fluid flow therebetween, said grid including a polygonal perimeter strip and a first and second plurality of half-slotted interlocking divider strip members arranged in a transverse intersecting egg-crate fashion to define a plurality of fuel element cells, the improvement in which: the fuel element support grid has each integral element support spring and definding cutout located in the slotted half of the divider members thereby making the material that is parallel and makes up the other half of the divider member unbroken by said half-slots and integral spring cutouts.

4,879,091

EQUIAXED DISPERSION STRENGTHENED COPPER PRODUCT AND PROCESS FOR MAKING SAME

Prasan K. Samal, Lyndhurst, and Anil V. Nadkarni, Mentor, both of Ohio, assignors to SCM Metal Products, Inc., Cleveland, Ohio

Filed Dec. 14, 1987, Ser. No. 132,799
Int. Cl.[4] C22C *9/00*
U.S. Cl. 419—19 **9 Claims**



1. A method for making a substantially fully-dense, near net-shape body made of dispersion strengthened copper powder and having a substantially equiaxed grain structure, comprising the steps of:

(a) pressing dispersion strengthened copper powder into a green compact; and

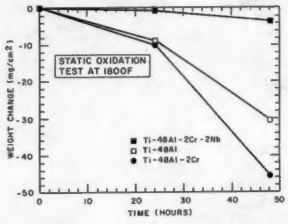
(b) hot isostatically pressing the compact into said body.

4,879,092

TITANIUM ALUMINUM ALLOYS MODIFIED BY CHROMIUM AND NIOBIUM AND METHOD OF PREPARATION

Shyh-Chin Huang, Latham, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 3, 1988, Ser. No. 201,984
Int. Cl.[4] C22C *14/00*; C21D *1/00*
U.S. Cl. 420—418 **18 Claims**



1. A chromium and niobium modified titanium aluminum alloy consisting essentially of titanium, aluminum, chromium and niobium in the following approximate atomic ratio:

$Ti_{52-42}Al_{46-50}Cr_{1-3}Nb_{1-5}$.

4,879,093

DUCTILE IRRADIATED ZIRCONIUM ALLOY

Anand M. Garde, Simsbury, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Jun. 10, 1988, Ser. No. 205,775
Int. Cl.[4] C21D *1/26*; C22C *16/00*
U.S. Cl. 420—422 **2 Claims**

1. An improved ductile modified Zircaloy alloy for use in light water nuclear reactor core structural comonents and fuel cladding which comprises:

measurable amounts of alloying material from the group of niobium or molybdenum -or combinations thereof, niobium being present in a range up to 0.6 percent by weight or molybdenum being present in a range up to 0.1 percent by weight, said alloying material homogeneously dissolved in alpha Zircaloy with 1.2 to 1.70 percent by weight tin, 0.07 to 0.24 percent by weight iron, 0.05 to 0.13 percent by weight chromium, up to 0.08 percent by weight nickel, and oxygen in the range of from 900 to 1600 ppm.

4,879,094

CU—SN—ZN—BI ALLOYS

William Rushton, Wakefield, England, assignor to IMI Yorkshire Fittings Limited, Leeds, England

Filed Oct. 17, 1988, Ser. No. 258,724

Claims priority, application United Kingdom, Oct. 16, 1987, 8724311

Int. Cl.[4] C22C *9/02, 9/04*

U.S. Cl. 420—476 **12 Claims**

1. A substantially lead free alloy containing from 1.5 to 7 wt % bismuth, from 5 to 15 wt % zinc, from 1 to 12 wt % tin, the balance being essentially copper.

4,879,095

RAPIDLY SOLIDIFIED ALUMINUM BASED SILICON CONTAINING, ALLOYS FOR ELEVATED TEMPERATURE APPLICATIONS

Colin M. Adam; Richard L. Bye, both of Morristown; Santosh K. Das, Randolph, and David J. Skinner, Long Valley, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 782,774, Oct. 2, 1985, abandoned. This application Apr. 17, 1987, Ser. No. 39,246

Int. Cl.[4] C22C *21/00*

U.S. Cl. 420—548 **12 Claims**

1. A rapidly solidified aluminum-base alloy consisting essentially of the formula $Al_{bal}Fe_aSi_bV_c$, wherein "a" ranges from 3.0 to 7.1 at %, "b" ranges from 1.0 to 3.0 at %, "c" ranges from 0.25 to 1.25 at % and the balance is aluminum plus incidental impurities, with the provisos that (i) the ratio (Fe+V):Si ranges from about 2.33:1 to 3.33:1, and (ii) the ratio Fe:V ranges from 11.5:1 to 5:1.

4,879,096

LEAD- AND ANTIMONY-FREE SOLDER COMPOSITION

Paul E. Naton, North Ridgeville, Ohio, assignor to Oatey Company, Cleveland, Ohio

Filed Apr. 19, 1989, Ser. No. 340,370

Int. Cl.[4] C22C *13/00*

U.S. Cl. 420—561 **12 Claims**

1. A lead- and antimony-free solder composition comprising as essential ingredients

about 0.05% to about 3% by weight of silver;

about 0.5% to about 6% by weight of copper,

about 0.1% to about 3% by weight of bismuth; and

about 88% to about 99.35% by weight of tin.

4,879,097

DISPENSING DEVICE AND RECORDING APPARATUS

Thomas P. Whitehead, 70 Northumberland Road, Leamington Spa, Warwickshire; Gary H. G. H. Thorpe, 84 Newcombe Road, Handsworth, Birmingham; Larry J. Kricka, 16 Newent Road, Northfield, Birmingham; John E. C. Gibbons, 9 Norfolk Close, Stirchley, Birmingham, and Roger A. Bunce, 117 Berberry Close, Bournville, Birmingham, all of England

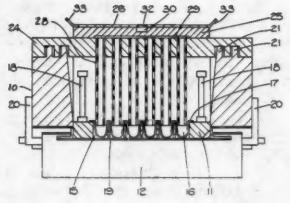
Continuation of Ser. No. 626,856, Jun. 27, 1984, Pat. No. 4,593,728. This application Apr. 4, 1986, Ser. No. 848,134

Claims priority, application United Kingdom, Nov. 20, 1982, 8233168; Apr. 26, 1983, 8311372

The portion of the term of this patent subsequent to Jun. 10, 2003, has been disclaimed.

Int. Cl.[4] G01N *21/03*

U.S. Cl. 422—67 **19 Claims**



1. Recording apparatus comprising:

a holder for a multiplicity of reaction vessels, said holder comprising a support plate having an array of holes therein for receiving an array of reaction vessels;

a housing for receiving said holder, said housing being sealed to prevent entry of stray light;

an openable cover for said housing;

film holding means for holding a photographic film adjacent an underside of said support plate; and

a shutter for interposition between said film holding means and said support plate;

said shutter being movable between a closed position between said film holding means and said support plate, and an open position wherein film held on said film holding means is exposed to use;

said support plate being adapted to rest on said shutter when said shutter is in the closed position and to drop towards said film holding means when said shutter is moved into the open position.

4,879,098

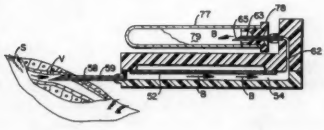
DEVICE FOR THE SEPARATION OF THE LIGHTER FRACTION FROM THE HEAVIER FRACTION OF A LIQUID SAMPLE

Bruce J. Oberhardt, Raleigh, and Phyllis J. Palmer, Durham, both of N.C., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Jan. 25, 1985, Ser. No. 694,717

Int. Cl.[4] G01N *1/14*

U.S. Cl. 422—101 **18 Claims**



1. An operable device for the separation of the lighter fraction from the heavier fraction of a liquid sample for use with two rigid evacuated receptacles wherein each receptacle in-

cludes an open end and a pierceable stopper sealably closing the open end comprising:

a housing having an interior cavity;

a separator membrane dividing said cavity into a first portion and a second portion, said separator membrane having a porosity selected for the desired separation thereacross;

inlet means for providing fluid communication between said first portion and the source of the liquid sample;

first communication means for providing fluid communication between said first portion and a first evacuated receptacle, said first communication means being positioned in opposed relationship from said inlet means so that liquid passing from said inlet means to said first communication means travels in a direction along the surface of said membrane;

second communication means for providing fluid communication between said second portion and a second evacuated receptacle so that when said inlet means is in fluid communication with the source of the liquid sample and said first communication means is in fluid communication with the first evacuated receptacle and said second communication means is in fluid communication with the second evacuated receptacle, the liquid sample flows through said inlet means along said membrane through said first communication means into the first evacuated receptacle, simultaneously, the lighter fraction of the liquid being drawn through said membrane and said second communications means into the second evacuated receptacle; and

holding means for holding the first evacuated receptacle and the second evacuated receptacle in a fixed relationship with respect to each other and coordinating means between said housing and said holding means to facilitate the controlled movement of the evacuated receptacles into engagement and fluid communication with said first communication means and said second communication means.

4,879,099

CATALYST BASKET FOR DENITRATION FOR USE IN AN EXHAUST GAS PASSAGE

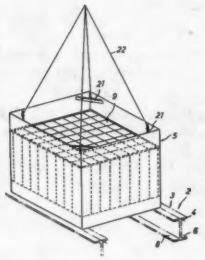
Hitoshi Koike, Kure, Japan, assignor to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Japan

Filed Jul. 3, 1986, Ser. No. 881,820

Claims priority, application Japan, Jul. 8, 1985, 60-102853[U]

Int. Cl.[4] B01T *32/00*

U.S. Cl. 422—177 **7 Claims**



1. In combination, a catalyst basket for denitration, shelves for supporting said basket, and an exhaust gas passage, said shelves being disposed in said exhaust gas passage and upon which basket dry NH_3 catalytic reduction catalyst elements are being placed, comprising a hollow body made of steel and detachably placeable on said shelves so as to permit exhaust gases to be denitrated to pass from one end of the body to the other end thereof, a catalyst element supporting member disposed at a bottom of said hollow body so as to permit the exhaust gases to pass, a plurality of catalyst elements supported by said catalyst element supporting member, said hollow body having at least one detachable side to enable said catalyst elements to be placed on said catalyst element supporting member, ceramic shock absorbers interposed between inner surfaces of said hollow body and the catalyst elements charged therein, and transportation means for said basket guided by said shelves.

4,879,100

CORONA DISCHARGE TREATMENT APPARATUS

Koichi Tsutsui, Kyoto; Shoji Ikeda, and Koji Ueki, both of Osaka, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

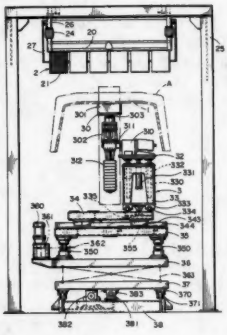
Filed Nov. 17, 1987, Ser. No. 122,158

Claims priority, application Japan, Dec. 23, 1986, 61-306749

The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.

Int. Cl.[4] B01J *19/08;* **H01T** *19/04*

U.S. Cl. 422—186.05 **7 Claims**



1. A corona discharge treatment apparatus for corona discharge treatment of the surface of an object, said apparatus comprising:

a plurality of treating zones positioned one treating zone after the other, each treating zone being arranged for treating a different part of the surface of the object to be treated;

transfer means for moving said object to be treated into each of said treating zones, one of said each treating zone after the other, for treating said different part of said surface in said treating zone and for moving said object into the next treating zone for treating another different part of said surface in said next treating zone and for repeating said moving, said treating and said moving into said next treating zone until all of said different parts of said object to be treated are treated;

a first electrode for contacting said object while said surface of said object is treated in each one of said treatment zones;

a second electrode immovably mounted in each said treating zone and responsive with said first electrode for impressing high voltage between said first electrode and said second electrode and to said different part of said surface of said object being treated in said each said treating zone for treatment of said different part of said surface of said object while said object is in said each treating zone; and

a high frequency and high voltage source connected in said each treating zone with said second electrode while said first electrode is grounded, for providing a corona discharge between said first electrode and said second electrode in said each treating zone and to said different part of said surface of said object being treated therein.

4,879,101

METHOD FOR PRODUCING A MAGNESIA POWDER FOR USE AS AN ELECTRICAL INSULATING MATERIAL

Yasuyoshi Oda, Tokyo, Japan, assignor to Shin Nihon Chemical Industry Co., Ltd., Osaka, Japan

Continuation of Ser. No. 874,686, Jun. 16, 1986, abandoned. This application Feb. 29, 1988, Ser. No. 165,346

Claims priority, application Japan, Jun. 17, 1985, 60-129954; Mar. 17, 1986, 61-56900

Int. Cl.[4] C01F *5/26;* C04B *35/04*

U.S. Cl. 423—163 5 Claims

1. A method for producing a magnesia powder for use as an electrical insulating material, said method comprising the steps of:

(a) providing a magnesia clinker powder;

(b) washing said powder with an aqueous solution of an acid; and either

(c) subjecting said acid-washed magnesia powder to heat treatment until the acid radical content of the magnesia powder is reduced to 0.015% by weight or less, or

(d) washing said acid-washed magnesia powder with water until the acid radical content of the magnesia powder is reduced to 0.015% by weight or less, and drying the magnesia powder.

4,879,102

REGENERATION OF WASH SOLUTIONS CONTAINING FE(II) AND FE(III) CHELATE COMPLEXES

Klaus-Dieter Hoppe, Wachenheim; Bernd Leutner, Frankenthal, and Siegfried Schreiner, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 30, 1988, Ser. No. 251,449

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 3732952

Int. Cl.[4] C01B *21/00*

U.S. Cl. 423—235 3 Claims

1. A process for regenerating a wash solution containing Fe(II) and Fe(III) chelate complexes and used for removing NO_x from a waste gas comprising adding an effective amount of sodium tetrahydroborate to a wash solution containing Fe(II) and Fe(III) chelate complexes at a pH of from 5 to 7 and at a temperature of from 20 to 80°C. to reduce the Fe(III) contained in the wash solution to Fe(II).

4,879,103

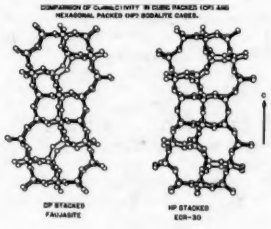
COMPOSITION AND PROCESS FOR PREPARING ECR-30

David E. W. Vaughan, Flemington, N.J., assignor to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 118,301, Nov. 6, 1987, abandoned, which is a continuation-in-part of Ser. No. 606,940, May 4, 1984, Pat. No. 4,714,601. This application Sep. 27, 1988, Ser. No. 249,754

Int. Cl.[4] C01B *33/28*

U.S. Cl. 423—329 9 Claims



1. An aluminosilicate with a structure characterized by having an x-ray diffraction pattern similar to that shown in Table 2, a silica to alumina mole ratio of at least six, and containing methyl triethyl ammonium, wherein said organic ammonium template is within the super cages of said aluminosilicate, said zeolite having a hexagonal unit cell.

4,879,104

PROCESS FOR PRODUCING CARBON BLACK

Steven J. List, Billerica, Mass., and Ronald C. Hurst, Pampa, Tex., assignors to Cabot Corporation, Waltham, Mass.

Filed Jun. 16, 1987, Ser. No. 63,187

Int. Cl.[4] C01B *31/02*

U.S. Cl. 423—450 10 Claims

1. A process for producing carbon black comprising

introducing a fuel and oxidant into a combustion zone at a rate sufficient to produce a gauge pressure within the combustion zone of at least 2.0 inches (51 mm) of mercury;

reacting the fuel and the oxidant so as to provide a stream of hot combustion gases possessing sufficient energy to convert a carbon blackyielding hydrocarbon feedstock to carbon black;

injecting hydrocarbon feedstock into the stream of hot combustion gases axially or substantially radially relative to the direction of the flow of the hot combustion gas stream under sufficient pressure to achieve penetration and mixing of the feedstock;

flowing the stream of hot combustion gases containing the feedstock through a transition zone and into a first reaction zone having an internal cross-sectional area larger than the internal cross-sectional area of the transition zone;

flowing the stream of hot combustion gases containing the feedstock out of the first reaction zone and into a throat zone having an internal cross-sectional area smaller than the internal cross-sectional area of the transition zone;

flowing the stream of hot combustion gases containing the feedstock out of the throat zone and into a second reaction zone having an internal cross-sectional area larger than the internal cross sectional area of the throat zone;

quenching the stream of hot combustion gases containing carbon black; and

cooling, separating and collecting the resultant carbon black.

4,879,105

WEAKLY ACIDIC BATH AGENTS

Hidenori Yorozu, Utsunomiya, Japan, assignor to Kao Corporation, Tokyo, Japan

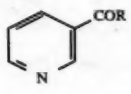
Filed Mar. 18, 1988, Ser. No. 169,879

Claims priority, application Japan, Apr. 1, 1987, 62-80481

Int. Cl.[4] A61L *9/04;* C11D *7/00*

U.S. Cl. 424—44 9 Claims

1. A weakly acidic bath agent comprising 5 to 80% by weight of carbon dioxide or a carbon dioxide-generating substance and 0.01 to 40% by weight of a derivative of nicotinic acid represented by the general formula:



wherein R represents a group $-OR_1$, in which R_1 is a saturated or an unsaturated hydrocarbon group having 1 to 10 of carbon atoms, or benzyl group.

4,879,106

METHODS FOR TREATING GINGIVITIS AND PARADENTAL PYORRHEA

Giorgio Voli, No. 17, Lungotevere Prati, 00193 Roma, Italy

PCT No. PCT/IT86/00048, § 371 Date Jan. 27, 1987, § 102(e) Date Jan. 27, 1987, PCT Pub. No. WO87/00051, PCT Pub. Date Jan. 15, 1987
PCT Filed Jul. 2, 1986, Ser. No. 19,558
Claims priority, application Italy, Jul. 2, 1985, 48306-A/85
Int. Cl.[4] A61K *7/22, 7/26, 33/24, 33/30*
U.S. Cl. 424—54 6 Claims

1. A method for treating gingivitis and paradental pyorrhea, comprising topically applying a medicament composition comprising from 1% to 3% by weight of the ammonium salt of sulfoichthyolic acid, from 5 to 20% by weight of zinc oxide, from 3 to 9% by weight of titanium dioxide and from 0.5 to 2% by weight of a fluid extract of Hamamelis, in a pharmaceutically acceptable carrier.

4,879,107

FOAMING COSMETIC COMPOSITIONS

Guy Vanlerberghe, Claye-Souilly; Henri Sebag, Paris; Michele Lagoutte, and Jean F. Grollier, both of Paris, all of France, assignors to L'Oreal, Paris, France

Filed May 4, 1988, Ser. No. 190,052
Claims priority, application Luxembourg, May 8, 1987, 86873
Int. Cl.[4] A61K *7/09*
U.S. Cl. 424—70 10 Claims

1. An aqueous foaming cosmetic composition for cleaning the hair or skin comprising at least one surfactant oligomer of formula (I):

(I)

wherein

R represents a linear C_{10} to C_{18} hydrocarbon radical,

R_1 and R_2, each independently, represent hydrogen or methyl,

$\overline{n}$ represents an average statistical value of 10 to 35,

$\overline{m}$ represents 0 or an average statistical value equal to or less than 5 and, when $\overline{m}$ is other than 0, the ratio $\overline{m}/\overline{n}$ is less than or equal to 0.25,

M represents H, Na, K or, as an ammonium group, NH_4, 2-ammonio-2-methyl-1-propanol, 2-ammonio-2-methyl-1,3-propanediol, trimethylhydroxyethylammonium or triethanolamine and,

as an acidifying agent, a C_2–C_6 carboxylic acid present in an amount such that said composition has a pH ranging from 3 to 7.

4,879,108

CONFECTIONERY DELIVERY SYSTEM FOR ANTIPYRETICS

Robert K. Yang, Randolph; Shri C. Sharma, Mendham; Shan-Shan Sheu, Parsippany, and James J. Shaw, Morristown, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 811,601, Dec. 20, 1985, Pat. No. 4,786,676. This application Oct. 14, 1988, Ser. No. 258,245
Int. Cl.[4] A61K *9/40, 9/16*
U.S. Cl. 424—440 14 Claims

1. A chewable confectionery delivery system for antipyretics comprising:

(a) an antipyretic pre-coated with at least one material selected from the group consisting of lecithin, polyoxyalkylenes having chain lengths of about 4 carbons or less, glycerides having a melting point of 100° C. or less, polyalkyleneglycols having a molecular weight of 3,700 or less, synthetic and natural waxes and mixtures thereof; and

(b) a confectionery matrix comprising a binder system comprising from about 0.1% to about 5% by weight gelatin and a humectant material selected from the group consisting of glycerin and its lower alkyl (C_{2-7}) ester derivatives, a sweetener; and about 1% to about 30% by weight water, all weights are in percent of the final delivery system.

4,879,109

METHOD FOR TREATING BURNS

Robert L. Hunter, Tucker, Ga., assignor to Emory University, Atlanta, Ga.

Continuation-in-part of Ser. No. 45,459, May 7, 1987, Pat. No. 4,801,452, which is a continuation-in-part of Ser. No. 43,888, Apr. 29, 1987, which is a continuation of Ser. No. 863,582, May 15, 1986, abandoned. This application Dec. 29, 1988, Ser. No. 291,925
Int. Cl.[4] A61K *31/745*
U.S. Cl. 424—83 9 Claims

1. A method of reducing tissue damage due to burns in an animal or human comprising the step of injecting into the animal or human with the burn an effective of amount of a solution of a surface active copolymer with the following general formula:

$$HO(C_2H_4O)_b(C_3H_6O)_a(C_2H_4O)_bH$$

wherein a is an integer such that the hydrophobe represented by (C_3H_6O) has a molecular weight of approximately 950 to 40000, and b is an integer such that the hydrophile portion represented by (C_2H_4O) constitutes approximately 50% to 95% by weight of the compound.

4,879,110

ANTIHYPERTENSIVE HYPERIMMUNE MILK, PRODUCTION, COMPOSITION, AND USE

Lee R. Beck, and Ralph J. Stolle, both of Lebanon, Ohio, assignors to Stolle Research and Development Corporation, Lebanon, Ohio

Continuation-in-part of Ser. No. 1,848, Jan. 9, 1987, which is a division of Ser. No. 546,162, Oct. 27, 1983, Pat. No. 4,636,384, which is a continuation-in-part of Ser. No. 384,625, Jun. 3, 1982, abandoned. This application Feb. 26, 1988, Ser. No. 161,039
Int. Cl.[4] A61K *39/06, 39/12*
U.S. Cl. 424—85.8 22 Claims

1. An anti-hypertensive factor, in substantially pure form, produced by a process comprising:

(i) obtaining milk from a hyperimmunized animal;

(ii) removing from said milk macromolecules having a molecular weight greater than about 10,000 daltons;

(iii) fractionating by ion-exchange chromatography the lower-than-10,000 dalton product of step (ii) to obtain a negatively charged product of molecular weight less than about 10,000 daltons;

(iv) fractionating by molecular sieve chromatography said negatively charged product from step (iii); and

(v) isolating by isoelectric precipitation said antihypertensive product fractionated in step (iv).

4,879,111

TREATMENT OF INFECTIONS WITH LYMPHOKINES

Kong-Teck Chong, Union City, Calif., assignor to Cetus Corporation, Emeryville, Calif.

Filed Apr. 17, 1986, Ser. No. 853,122
Int. Cl.[4] A61K *45/02, 37/02*
U.S. Cl. 424—85.2 16 Claims

1. A method for prophylactic or therapeutic treatment of bacterial infections in mammalian hosts comprising administering an effective amount of tumor necrosis factor (TNF) from a mammalian species, to the host, before or after infection of the

host, wherein the amount of TNF is a sufficient dose to achieve at least 50% protection of the host.

9. A method for prophylactic or therapeutic treatment of bacterial infections in mammalian hosts comprising administering an effective amount of tumor necrosis factor (TNF) and interleukin-2 (IL-2), both from a mammalian species, to the host, before or after infection of the host, wherein the amount of TNF and IL-2 is a sufficient dose to achieve at least 50% protection of the host.

11. A method for propylactic or therapeutic treatment of bacterial infections in mammalian hosts comprising administering an effective amount of tumor necrosis factor (TNF) and interferon-gamma (IFN-γ), both from a mammalian species, to the host, before or after infection of the host, wherein the amount of TNF and IFN-γ is a sufficient dose to achieve at least 50% protection of the host.

4,879,112

MONOCLONAL ANTIBODIES AGAISNT GNRH

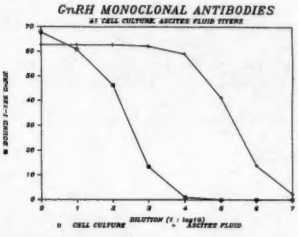
David W. Silversides; Reuben J. Mapletoft; Bruce D. Murphy, and Virkam Misra, all of Saskatoon, Canada, assignors to University of Saskatchewan, Saskatoon, Canada

Continuation of Ser. No. 577,694, Feb. 7, 1984, Pat. No. 4,676,981. This application May 15, 1987, Ser. No. 50,023

The portion of the term of this patent subsequent to Jun. 30, 2004, has been disclaimed.

Int. Cl.[4] A61K *39/395;* **C12N** *5/00, 15/00;* **C12P** *21/00*

U.S. Cl. 424—85.9 **21 Claims**



1. A monoclonal antibody designated USAKS/DSIL-GnRH produced by a hybridoma deposited in ATCC under designation HB-9094 and formed by fusion of cells from a mouse myeloma line and antibody producing spleen cells from a mouse previously immunized with a source of GnRH, said monoclonal antibody having the following characteristics:

(i) producing a short term reduced mean level of LH in female mammals of the zoological order Carnivora after passive immunization;

(ii) producing a short term reduced pulsatile secretion of LH in female mammals of the zoological order Carnivora after passive immunization;

(iii) being effective in passive immunization to terminate pregnancy in a female mammal of the zoological order Carnivora with an accompanying decline in progesterone levels;

(iv) being effective in passive immunization to produce a long term reduced testosterone level in a male mammal of the zoological order Carnivora; and

(v) being effective in passive immunization to induce infertility in a male mammal of the zoological order Carnivora.

4,879,113

VACCINE FOR IMMUNOLOGICALLY MEDIATED NUTRITIONAL DISTURBANCES ASSOCIATED WITH PLANT PROTEIN ANTIGENS

Clyde K. Smith, 3743 Bay Shore Dr., Sturgeon Bay, Wis. 54235

Filed Oct. 27, 1987, Ser. No. 114,082

Int. Cl.[4] A61K *39/00, 39/12, 39/02*

U.S. Cl. 424—88 **24 Claims**

1. A method for suppressing immunologically-mediated nutritional disturbances associated with pre-ruminant bovine ingestion of dietary plant protein, which comprises the steps of:

(a) administering to said pre-ruminant bovine said plant protein in an amount effective to prevent a nutritional disturbance in said pre-ruminant bovine due to the formation of an immune response to the dietary plant protein; and

(b) parenterally administering to said pre-ruminant bovine of step (a) again a second effective amount of said plant protein, there being a selected suitable time interval between said two administrations.

4,879,114

LIPIDS FROM OMENTUM AND METHODS FOR COSMETIC USE

Nicholas Catsimpoolas, Newton Centre; Ahmad R. Kamarei, Arlington; Ann L. Griffith, Newton Centre, all of Mass., and Robert S. Sinn, New York, N.Y., assignors to Angio-Medical Corporation, Avenue of the Americas, N.Y.

Filed Dec. 20, 1985, Ser. No. 811,505

Int. Cl.[4] A61K *35/12, 7/42, 7/32, 7/06*

U.S. Cl. 424—95 **24 Claims**

1. A topical cosmetic composition for skin care consisting essentially of an omental lipid and a cosmetic agent in a stable cosmetic formulation selected from the group consisting of a cream, shampoo, oil, lotion, sunscreen, deodorant, powder, moisturizer, soap, solid, stick and ointment.

4,879,115

FEED EFFICIENCY IMPROVEMENT COMPOSITION

James L. Brunton, Amarillo, Tex., assignor to Aerion Industries, Inc., Amarillo, Tex.

Filed Feb. 6, 1987, Ser. No. 11,548

Int. Cl.[4] A61K *33/06, 33/10, 33/08*

U.S. Cl. 424—694 **7 Claims**

1. A composition for increasing growth rate and decreasing feed to gain ratio in animals comprising: feeds having a proper nutritional balance and a strengthened positive valency of the feeds resulting from the foods having a positive electrical charge of from 10^{-9} to 10^{-7} coulombs.

4,879,116

SKIN PROTEIN COMPLEXING COMPOSITION FOR THE POTENTIATION OF THE SUBSTANTIVITY OF ALUMINUM ACETATE THROUGH THE USE OF A CATIONIC EMULSIFIER AS AN AID IN SKIN HEALING

Charles Fox, 39-08 Tierney Pl., Fairlawn, N.J. 07410; John W. DeWitt, 9 Parker Ct., Florham Park, N.J. 07932, and John D. Rothenberger, Jr., 303 Parkside Rd., Harrington Park, N.J. 07640

Filed Jun. 13, 1988, Ser. No. 207,871

Int. Cl.[4] A01N *59/06*

U.S. Cl. 424—682 **6 Claims**

1. A stabilized and synergistic therapeutic skin healing and soothing preparation for topical application to the skin containing from 0.1% to 5.0% of a topical astringent the Markush, "selected from the group consisting of aluminum acetate aluminum sulfate, witch hazel, salts of zinc maganese, iron and bismuth, tannins, polyphenolic compounds, acids alcohols and phenols capable of precipitating proteins, and from 0.25% to 5.0% of a cationic surfactant salt

where the accompanying anion is a chloride, bromide, or sulfate ion.

4,879,117

INSECTICIDAL COLLAR AND PROCESS FOR PRODUCING IT

Max A. Rombi, 67, rue Rossini, 06000 Nice, France

Filed Apr. 3, 1984, Ser. No. 596,271

Claims priority, application France, Apr. 14, 1983, 83 06099; Nov. 29, 1983, 83 19005

Int. Cl.[4] A01N *25/34*

U.S. Cl. 424—411 **5 Claims**

1. A ready-for-use insecticidal collar for animals in strip form comprising

(a) an inner element comprising an absorbent textile material impregnated with a liquid insecticidal composition comprising a liquid insecticidal pyrethroid or pyrethrin and a hygroscopic substance selected from the group consisting of calcium chloride, magnesium chloride, lecithin, choline and salts thereof, said hygroscopic substance being present in an amount of about 1 to 10 parts by weight per 100 parts by weight of said liquid insecticidal composition, and

(b) a polyvinyl chloride casing surrounding said inner element, at least a portion of said casing being permeable to said liquid insecticidal composition.

4,879,118

GLYCYRRHETINIC ACID-CONTAINING PLASTERS

Makoto Senuma, Tokyo; Shigeru Kondoh, Saitama; Tadamasa Kawase, Saitama, and Yoshihiko Nakagawa, Saitama, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 705,549, Feb. 26, 1985, abandoned. This application Mar. 3, 1988, Ser. No. 168,587

Claims priority, application Japan, Mar. 7, 1984, 59-41994

Int. Cl.[4] A61F *13/02*; A61L *15/06*; A61K *31/19*

U.S. Cl. 424—448 **6 Claims**

1. An antipruritic plaster comprising a backing having formed on one surface thereof a pressure-sensitive adhesive layer containing:

(1) from about 0.1 to about 10 percent by weight, based on the total weight of said plaster, of a glycyrrhetinic acid compound selected from the group consisting of glycyrrhetinic acid, glycyrrhizin and salts of glycyrrhizin,

(2) from about 1 to about 20 percent by weight of at leastone solvent for dissolving said glycyrrhetinic acid compound selected from benzyl alcohol, phenethyl alcohol, diphenhydramine, chlorpheniramine and crotamiton, and

(3) a base of either:

(a) from about 75 to about 98.5 percent by weight based on the total weight of said adhesive layer of at least one rubber compound adhesive plaster base selected from natural rubber, a styrene-butadiene copolyer elastomer, and a styrene-isoprene-styrene copolymer elastomer; at least one tackifying agent selected from a petroleum resin, rosin, hydrogenated rosin, and an ester gum; and at least one softener selected from polybutene, liquid paraffin, a higher fatty acid ester, a silicon oil, and a vegetable oil, or

(b) from about 65 to about 98.5 weight percent based on the total weight of said adhesive layer of an acrylic resin.

4,879,119

PATCH

Yutaka Konno; Hiroitsu Kawata; Masayoshi Aruga; Takashi Sonobe, all of Saitama, and Mitsuo Mitomi, Tokyo, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

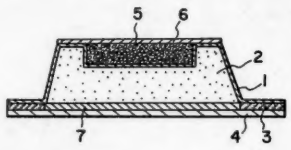
Continuation of Ser. No. 17,886, Feb. 20, 1987, abandoned, which is a continuation of Ser. No. 699,585, Feb. 8, 1985, Pat. No. 4,685,911. This application Aug. 26, 1988, Ser. No. 239,013

Claims priority, application Japan, Feb. 21, 1984, 59-31934

The portion of the term of this patent subsequent to Aug. 11, 2004, has been disclaimed.

Int. Cl.[4] A61F *13/00*

U.S. Cl. 424—449 **7 Claims**



1. A transdermal patch comprised of a polyvinyl chloride container, an adhesive layer on said container at the portion to be applied to the skin, and wherein said adhesive layer is covered by a liner, said patch containing a solution or a suspension of a drug component selected from the group consisting of nicardipine hydrochloride, nifedipine, dipyridamole, formoterol fumarate, indenolol and -oryzanol, and wherein said drug component is uniformly dispersed in a base mainly comprising cacao butter, isocacao butter or a triglyceride of a vegetable saturated fatty acid having 12 to 18 carbon atoms together with a penetration enhancer.

4,879,120

POLYCAPROLACTAM WITH TITANIUM DIOXIDE CONTENT

Rudolf Wehr, Wachenheim, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 25, 1988, Ser. No. 236,211

Int. Cl.[4] C08K *3/22*

U.S. Cl. 524—430 **4 Claims**

1. A polycaprolactam with a titanium dioxide content which, based on titanium dioxide, contains less than 0.1% by weight of 100° C. water solubles and from 2 to 15% by weight of monomeric caprolactam and oligomers thereof, based on polycaprolactam.

3. A polycaprolactam as claimed in claim 1 containing from 0.5 to 3% by weight of aluminum oxide, based on titanium dioxide.

4,879,121

ZEOLITES IN POULTRY FEEDING

Sebastian M. Laurent, Greenwell Springs, and Robert N. Sanders, Baton Rouge, both of La., assignors to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 846,188, Mar. 31, 1986, abandoned, which is a continuation of Ser. No. 741,572, Jun. 5, 1985, abandoned, which is a division of Ser. No. 475,370, Mar. 14, 1983, Pat. No. 4,556,564. This application Nov. 24, 1986, Ser. No. 934,460

The portion of the term of this patent subsequent to Dec. 3, 2002, has been disclaimed.

Int. Cl.[4] A23K *1/00*

U.S. Cl. 426—2 **20 Claims**

1. A method of improving the lean/fat ration of broiler poultry as correlated with the very low density lipoproteins in the blood of said poultry, said method comprising feeding said

poultry an amount of zeolite A sufficient to improve said ratio, said zeolite A being incorporated in an amount of up to about 4 weight percent in poultry feed.

4,879,122

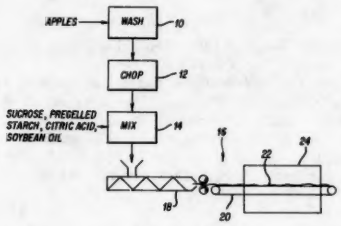
CRUNCHY FRUIT BRITTLE PRODUCT AND PROCESS

William B. Seely, Jr., Dallas, and Charmaine C. Jackson, Coppell, both of Tex., assignors to Frito-Lay, Inc., Dallas, Tex.

Continuation of Ser. No. 880,056, Jun. 30, 1986, abandoned. This application Jan. 7, 1988, Ser. No. 143,237

Int. Cl.[4] A23L *1/072*

U.S. Cl. 426—102 **26 Claims**



1. A method for preparing a crunchy fruit brittle which comprises:

(a) chopping apples or pieces thereof into particles, at least 35% of which have a particle size from about 0.03 inches to about 0.14 inches;

(b) admixing the apple particles with a binder/texturizer composition comprising from about 5% to about 100% by weight of a crystallizable sugar; from about 0% to about 55% of a moisture-adsorbing substance; and from about 0% to 40% by weight of a softening or tenderizing agent, the weight ratio of apple particles to binder/texturizer solution being from about 20:1 to about 7:1;

(c) sheeting the mixture to a thickness from about 0.04 inches to about 0.16 inches; and

(d) drying the sheeted mixture to a moisture content from about 0% to about 3.0%, provided that at least 40% of the apple cells are maintained intact.

4,879,123

TUBULAR PACKAGE CASING COMPOSED OF MUTUALLY CONNECTED SECTIONS

Manfred Siebrecht, Wiesbaden, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 21, 1988, Ser. No. 184,415

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1987, 3713479

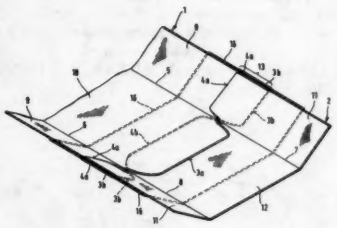
Int. Cl.[4] A22C *13/00*; A23L *1/317*

U.S. Cl. 426—105 **9 Claims**

1. A tube, comprising:

mutually connected first and second longitudinal sections of flexible material, said sections having at the connection point cut edges which extend approximately at right angles to the longitudinal axis of the tube and parallel to each other and cut edge regions which overlap in an overlapping zone which is of approximately rectangular shape when the tube is in a flattened condition and;

an adhesive tape extending around the outside of the tube and connecting said sections to one another, wherein in the case of the tube in a flattened condition having two folded edges extending parallel to each other, a first half of the cut edge region of the first section which extends along a first side from a first folded edge to the other opposite folded edge is situated within the tube and a second half of the cut edge region of the first section which extends along a second side, opposite said first side, from the second folded edge back to the first folded edge is situated on the outside of the tube, while a first half of the cut edge region of the second section which extends



along the first side is situated on the outside of the tube and a second half of the cut edge region of the second section which extends along the second side is situated within the tube.

4,879,124

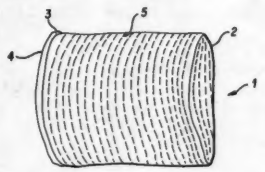
PERFORATED COOK-IN SHRINK BAG

Timothy T. Oberle, Duncan, S.C., assignor to W. R. Grace & Co.-Conn, Duncan, S.C.

Continuation of Ser. No. 785,419, Oct. 8, 1985, abandoned. This application Apr. 19, 1988, Ser. No. 183,116

Int. Cl.[4] B65D *81/34, 30/08, 30/02*

U.S. Cl. 426—113 **3 Claims**



1. A sealed perforated heat shrinkable bag containing a meat product to be cooked therein comprising:

(a) a seamless, biaxially oriented heat shrinkable tube of thermoplastic film forming the body of the bag;

(b) a transverse heat seal closing one end of the tube, said closed end defining the bottom of the bag, the other end defining the mouth of the bag which too is closed and wherein said meat product is contained therein, said heat shrinkable thermoplastic film shrinking with predominantly transverse shrink tension;

(c) an array of spaced apart perforations in the body of said bag, said perforations being arrayed and spaced apart relative to each other in both the transverse and longitudinal direction of the bag, each perforation being an elongated slit aligned to extend in the transverse direction of the bag and the slits are dimensioned both in length and the space between slits sufficient such that when the bag is heat shrunk during cook-in with said meat product enclosed therein splitting of the tube film is reduced during cook-in, as compared to needle perforated film.

4,879,125

SANDWICH IN A LUNCH BOX

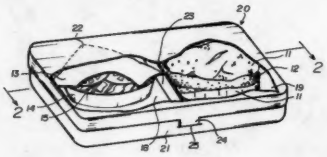
Tong S. Pak, Rte. 15, Box 115, Oak Grove Cir., Statesville, N.C. 28677

Continuation-in-part of Ser. No. 924,261, Oct. 29, 1986, Pat. No. 4,765,998. This application Aug. 16, 1988, Ser. No. 232,851

The portion of the term of this patent subsequent to Aug. 23, 2005, has been disclaimed.

Int. Cl.[4] A21D *13/00;* **A23L** *1/31;* **B65D** *1/34, 1/42*

U.S. Cl. 426—120 **7 Claims**



1. A sandwich in a lunch box which comprises:

a lunch box having first and second parts partitioned in said lunch box,

two slices of bread disposed in said first part, said two slices of bread having inserted therebetween a meat product, and

an edible container disposed in said second part, said edible container housing a salad therein and having a concave configuration disposed at the bottom surface with a circular edge portion for causing the edible container to tightly adhere to the meat product when the edible container is inserted into said slices of bread, whereby the salad is separated from the meat product to maintain its fresh condition while at the same time prevented from falling from the sandwich.

4,879,126

METHOD FOR PREVENTING DISTORTION IN THE SHAPE OF FRIED STRAND-LIKE EXPANDED SNACKS

Miles J. Willard, P.O. Box 1747; Jane J. Arnold, 1120 Orlin, and Veldon M. Hix, Rte. #6, Box 263, all of Idaho Falls, Id. 83401

Continuation of Ser. No. 732,908, May 9, 1985, abandoned, which is a continuation of Ser. No. 631,509, Jul. 16, 1984, abandoned, which is a continuation of Ser. No. 384,896, Jun. 4, 1982, abandoned. This application Dec. 9, 1985, Ser. No. 806,128

Int. Cl.[4] A21D *2/36;* **A23L** *1/217;* **A23P** *1/14*

U.S. Cl. 426—272 **32 Claims**

1. A method for preventing distortion of an elongated, thin strand-like expanded fried snack product, the method comprising the steps of:

preparing a dough from starch-containing cereal solids, potato solids, or mixtures thereof and sufficient water so that the dough contains from about 35% to about 60% moisture by weight of the dough, in which a portion of the starch contained in the dough is gelatinized and in which additional starch contained in the dough is ungelatinized;

forming said dough into a composite dough piece comprising at least two elongated, thin strand-like dough pieces adhered to one another by point contact along the length of the dough strands; and

frying said composite dough piece in hot cooking oil and at said 35% to 60% moisture content and with said combination of gelatinized and ungelatinized starches being contained in the dough piece at the time of frying to form a finished fried expanded snack product having a moisture content of about 2% or less, in which the strands of the finished composite product are joined along the point of adherence while maintaining their separate strand-like shape throughout the frying step for substantially reducing distortion of the composite fried snack product when compared with the same dough strand fried singly.

4,879,127

METHOD OF PRESERVING PRODUCE FOR FURTHER PROCESSING

Yuan K. Liu, Concord; Philip A. Kuhmichel, Antioch; Fred G. Cordes, Oakland, and Wayman Wong, Concord, all of Calif., assignors to Del Monte Corporation, San Francisco, Calif.

Continuation of Ser. No. 78,803, Jul. 28, 1987, abandoned, which is a continuation-in-part of Ser. No. 76,702, Jul. 23, 1987. This application Nov. 1, 1988, Ser. No. 266,338

Int. Cl.[4] A23B *7/04, 7/08;* **A23L** *3/10*

U.S. Cl. 426—325 **11 Claims**

1. A method of preparing canned produce wherein the texture and flavor of the produce are retained after extended storage in a frozen state at freezer temperatures ranging from about −20° F. to about +10° F., which comprises the steps of suspending the produce in a solutes containing, substantially isotonic aqueous storage solution in which the solutes content is adjusted such that the osmotic pressures of the produce and solution are substantially equal; freezing the produce, while suspended in said solution in cold storage at temperatures ranging from about −20° F. to about +10° F. and maintaining the produce in a frozen state at said temperatures; removing the produce from the storage solution and from cold storage thereby thawing the produce without loss of structural integrity and organoleptic characteristics; filling the produce into cans with canning syrup; sealing the cans; and then sterilizing the contents of the cans.

4,879,128

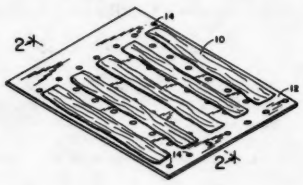
METHOD OF PRE-COOKING BACON

Paul G. Morin, Madison, Wis., and Tommy L. Hoes, Waco, Tex., assignors to Oscar Mayer Foods Corporation, Madison, Wis.

Filed Jan. 15, 1988, Ser. No. 144,291

Int. Cl.[4] A23L *1/31;* **A65B** *35/30, 25/08*

U.S. Cl. 426—392 **8 Claims**



1. A method for packaging bacon comprising the steps of placing on sheets of greaseproof interleaving paper a plurality of bacon slices so that a plurality of bacon slices are placed in a single layer on each of said sheets, cooking said bacon slices on said sheets of interleaving paper, said bacon cooked on said interleaving paper to a bacon yield of 25% to 40%, then stacking said sheets of interleaving paper with said cooked bacon thereon so that said cooked bacon is between each of said sheets; and then packaging said stack of sheets of interleaving

paper and said cooked bacon slices therebetween; said interleaving paper having a multiplicity of holes with a hole size diameter range from between 0.07 inches to 0.02 inches and with a centerline distance between the holes range from between 0.3 inches to 1.25 inches, said paper having a minimum weight of 25 pounds and a grease proofness rating of 600 or greater.

4,879,129

METHOD OF WASHING AND COOLING A DAIRY PRODUCT

Meredith C. Thomson, Sheboygan, Wis., assignor to Kusel Equipment Company, Watertown, Wis.

Division of Ser. No. 169,957, Mar. 18, 1988, Pat. No. 4,829,890. This application Feb. 13, 1989, Ser. No. 309,182

Int. Cl.[4] A23C *19/02*

U.S. Cl. 426—506 **6 Claims**

1. A method of washing and cooling a friable degradable material of cheese curds and whey comprising the steps of:

(a) disposing a longitudinally extending housing for containing a fluid in an generally horizontal position and establishing an upstream end and a downstream end in said housing;

(b) admitting a washing and cooling fluid into said housing through a fluid inlet adjacent said upstream end and discharging said fluid from said housing through a fluid outlet adjacent said downstream end to establish a reservoir of flowing fluid in said housing that has a normal direction of fluid flow;

(c) placing said material in an unwashed and uncooled condition into said reservoir of flowing fluid adjacent said downstream end;

(d) lifting said material in said reservoir of flowing fluid in a direction generally transverse to said normal direction of fluid flow;

(e) lowering said material in said reservoir of flowing fluid and simultaneously moving said material, as it is being lowered, at an acute angle relative to said normal direction of fluid flow toward said upstream end;

(f) repeating steps (d) and (e) until said material is moved to said upstream end of said housing and;

(g) discharging said washed and cooled material through a material discharge output in said housing adjacent said upstream end.

4,879,130

PROCESS FOR PREPARATION OF A FLAVORING AGENT

Sven Heyland, Weiningen; Karl Rolli, Winterthur; David Röschli, Pfungen, and Jaak J. Sihver, Gutenswil, all of Switzerland, assignors to Nestec S.A, Vevey, Switzerland

Filed Mar. 15, 1988, Ser. No. 168,426

Claims priority, application Switzerland, Apr. 6, 1987, 1317/87

Int. Cl.[4] A23L *1/231*

U.S. Cl. 426—533 **7 Claims**

1. A process for carrying out a Maillard reaction and preparing a flavoring agent comprising:

mixing from 70% to 95% by weight of at least one source of free amino acids having a water content of from 1% to 3% by weight with from 1% to 25% by weight of additives comprising at least one reducing sugar and water such that the water content of the mixture is from 5% to 12% water by weight for forming a paste-like mixture;

kneading and heating the paste-like mixture for plasticizing it;

propelling the plasticized mixture through an extrusion unit under a pressure of from 1 to bar to 100 bar while heating the plasticized mixture at a temperature of from 80° C. to 140° C. for from 30 secs to 30 mins for reacting the mixture; and

extruding the reacted mixture through an extrusion die into a chamber having a reduced pressure of from 5 mbar to 50 mbar for drying and cooling the reacted mixture and obtaining a flavorant.

4,879,131

PREPARATION OF WHEY PRODUCTS HAVING REDUCED ALLERGERICITY

Olivier de Rahm, La Tour-de-Peilz, Switzerland, assignor to Nestec S.A., Vevey, Switzerland

Filed Sep. 16, 1988, Ser. No. 245,463

Claims priority, application Switzerland, Oct. 15, 1987, 4041/87

Int. Cl.[4] A23C *7/04, 9/14;* A23L *1/305*

U.S. Cl. 426—583 **6 Claims**

1. A process for reducing e allergenicity of whey products comprising preparing an aqueous solution of a whey product having from 0.5% to 5.0% by weight of non-denatured whey proteins, adjusting the pH of the solution to a pH of from 5.5 to 8.5, adjusting free calcium content of the solution to a concentration of from 6 mmol/l to 15 mmol/l and heating the solution for from about 2 minutes to about 10 minutes at a temperature of from 90° C. to 140° C. for obtaining a treated whey product solution having a residual β-lactoglobulin content of less than 0.1% of a β-lactoglobulin content of the aqueous solution of the whey product to be treated.

4,879,132

APPARATUS FOR INACTIVATION OF ENZYMES IN OIL SEEDS

Kanji Tsuchiya, Tokyo, and Shizumi Ono, Chiba, both of Japan, assignors to Seikensha Company Limited, Tokyo, Japan

Division of Ser. No. 708,850, Mar. 6, 1985, Pat. No. 4,630,534. This application Jul. 30, 1986, Ser. No. 890,641

Int. Cl.[4] A23L *1/20*

U.S. Cl. 426—634 **5 Claims**

1. A method for the inactivation of lipoxidase enzyme in oil seeds within an elongated pressure cylinder having a first zone, a second zone and a third zone, comprising

feeding a product to be treated consisting essentially of whole or skinned oil seeds to the first zone of said elongated pressure cylinder and conveying said oil seeds within said pressure zone cylinder to said second zone thereof;

feeding a non-toxic buffer solution at a pH of about 8–10 to the interior of said elongated pressure cylinder at approximately the end of said first zone, said buffer solution providing an alkaline environment for said oil seeds;

subjecting said oil seeds to agitation and heating under pressure with steam in said second zone to effect a temperature of about 100°–110° C. of said oil seeds in said second zone, and effecting said agitation and heating under pressure in an alkaline environment in said second zone for a time sufficient to effect inactivation of lipoxidase enzyme in said oil seeds; and

passing said oil seeds from said second zone into said third zone and then discharging the resultant enzyme-inactivated oil seeds from said elongated pressure cylinder.

4,879,133

MODIFIED GLUTEN PRODUCT AND BREAD IMPROVER COMPOSITION

Shigeru Endo, Kawagoe; Satoshi Nomura, Tokorozawa; Shinji Ishigami, Tanashi, and Sonoko Karibe, Tokyo, all of Japan, assignors to Nisshin Flour Milling Co., Ltd., Tokyo, Japan

Filed Mar. 8, 1988, Ser. No. 165,526

Claims priority, application Japan, Mar. 12, 1987, 62-57645; Mar. 12, 1987, 62-57646

Int. Cl.[4] A21D *2/00*

U.S. Cl. 426—653 **5 Claims**

1. A water-insoluble, modified gluten which is prepared by kneading a mixture of wheat flour, L-ascorbic acid, cystine and water, then causing a mechanical damage to the resulting dough-like hydrated flour mixture so kneaded, until the dough-

like hydrated flour mixture contains proteins which are soluble in 0.05 N aqueous acetic acid, at a content of 75 to 85% as calculated on the basis of the total content of the protein present in said dough-like hydrated flour mixture, and subsequently separating the water-insoluble, modified gluten from the dough-like hydrated flour mixture which has received the mechanical damaging step.

4,879,134

FINGERPRINTING COMPOSITIONS, SYSTEMS AND METHODS

Anthony E. Vassiliades, 8738 Tanager Woods Dr., Cincinnati, Ohio 45249

Continuation of Ser. No. 938,420, Dec. 5, 1986, abandoned. This application Oct. 5, 1988, Ser. No. 253,941

Int. Cl.[4] A61B *5/10;* **B41K** *1/00;* **C09D** *11/00*

U.S. Cl. 427—1 **13 Claims**

1. A self-contained inkless liquid composition for use in making fingerprints comprising the reaction product of at least one leuco or non-leuco chromogenic compound and at least one color-developing substance, metallic ions, a compound capable of forming complexes of low stability in an alkaline medium with said metallic ions, and a liquid vehicle that is a solvent for said chromogenic compound and reaction product and a solvent or dispersant for said color-developing substance.

7. A fingerprinting system comprising means capable of releasably retaining a liquid and an inkless liquid composition releasably retained in said means, said liquid composition comprising the reaction product of at least one leuco or non-leuco chromogenic compound and at least one color-developing substance, metallic ions, a compound capable of forming complexes of low stability in an alkaline medium with said metallic ions, and a liquid vehicle that is a solvent for said chromogenic compound and reaction product and a solvent or dispersant for said color-developing substance.

4,879,135

DRUG BONDED PROSTHESIS AND PROCESS FOR PRODUCING SAME

Ralph S. Greco, Princeton; Richard A. Harvey, East Brunswick, and Stanley Z. Trooskin, North Brunswick, all of N.J., assignors to University of Medicine and Dentistry of New Jersey, Newark, N.J.

Continuation-in-part of Ser. No. 852,849, Apr. 11, 1986, which is a continuation-in-part of Ser. No. 633,615, Jul. 23, 1984, Pat. No. 4,740,382. This application Jul. 18, 1988, Ser. No. 220,503

The portion of the term of this patent subsequent to Apr. 26, 2005, has been disclaimed.

Int. Cl.[4] A61F *1/00, 1/24*

U.S. Cl. 427—2 **17 Claims**

1. A prosthesis for use in in vivo surgery having a coating, respectively, of an anionic surfactant and an oppositely charged drug bound to the surfactant.

4,879,136

METHOD OF APPLYING OPAQUE DENTAL CERAMIC MATERIAL TO A METAL STRUCTURE

M. H. Pölz, Erlangen, Fed. Rep. of Germany, assignor to Dentsply G.m.b.H., Dreieich, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 18,211, Feb. 24, 1987, Pat. No. 4,806,383. This application Oct. 15, 1987, Ser. No. 109,140

The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.

Int. Cl.[4] A61C *13/00, 13/09, 6/02;* **B05D** *1/36*

U.S. Cl. 427—2 **15 Claims**

1. A method for coating a metal structure for a dental appliance consisting essentially of the steps of: preparing an opaque ceramic paste by mixing an opaque ceramic powder with an organic liquid having a boiling point below about 300° C., coating said metal structure with said opaque ceramic paste to prepare a coating of opaque ceramic paste on said metal structure, dusing said coating with a coarse ceramic powder having an average grain size of from about 40 um to about 100 um said powder having thermal stability such that at least a substantial part of grain structure of said powder is maintained under conditions of firing said dental appliance, applying at least one additional layer of ceramic opaque paste, applying a stain paste to an additional layer of ceramic opaque paste, and firing said dental appliance.

4,879,137

METHOD AND APPARATUS FOR ELECTROSTATIC COATING WITH CONDUCTIVE MATERIAL

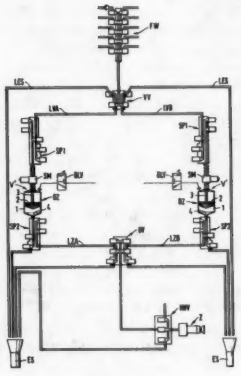
Hans Behr, Stuttgart, and Kurt Vetter, Remseck, both of Fed. Rep. of Germany, assignors to Behr Industrieanlagen GmbH & Co., Fed. Rep. of Germany

Filed May 24, 1988, Ser. No. 198,184

Claims priority, application Fed. Rep. of Germany, May 27, 1987, 3717929; Jul. 29, 1987, 3725172

Int. Cl.[4] B05D *1/04;* **B05B** *5/02, 15/02*

U.S. Cl. 427—27 **10 Claims**



1. A method for successively coating workpieces with an electrically conductive coating material comprising the steps of: moving a quantity of coating material from a storage supply to an intermediate isolation tank (V'); moving the quantity of coating material from the isolation tank (V') to a spraying device (Z) for coating a workpiece; and characterized by adjusting the capacity of the isolation tank (V') prior to moving the coating material to the tank to correspond with the quantity of coating material to be supplied from the storage supply and moved to the spraying device (Z).

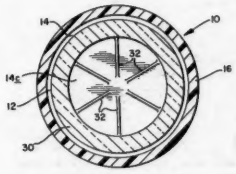
4. A coating apparatus for successively coating workpieces with an electrically conductive coating material comprising: an isolation tank (DZ) having a coating material capacity for storing coating material supplied thereto; a spraying device (Z) in fluid communication with said isolation tank (V') for spraying coating material from said isolation tank (V') onto a workpiece; fluid expulsion means (PL_1) associated with said isolation tank (V') for applying a pressurized gas to the coating material in said isolation tank (V') to move the coating material from said location tank (V') to said spraying device (Z); and said isolation tank (V') including metering cylinder means (DZ) for adjusting the coating material capacity of said isolation tank (DZ) to a predetermined volume before coating material is supplied thereto and for maintaining the capacity at the predetermined volume while said fluid expulsion means (PL_1) moves the coating material therefrom.

4,879,138

COMPOSITION FOR PLASTIC ARTICLE WITH UNITARILY MOLDED FOAM LAYER

Marion Johnson, Baytown; Granville J. Hahn, and Ramiro V. Ramoos, both of Big Spring, all of Tex., assignors to Permian Research Corporation, Big Spring, Tex.

Division of Ser. No. 195,094, May 17, 1988, which is a continuation-in-part of Ser. No. 922,127, Oct. 23, 1986, Pat. No. 4,744,478. This application May 8, 1989, Ser. No. 348,510
Int. Cl.[4] B32B 7/02; B65D 53/00
U.S. Cl. 428—218 13 Claims



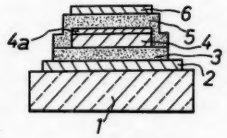
1. A molded polymeric container closure comprising: A major portion of moldable polypropylene resin; from about 1.25 to about 6 parts per hundred of resin (pphr) foam concentrate; from about 0.15 to about 1 pphr calcium carbonate; from about 0.03 to about 0.15 pphr amorphous silicon dioxide; from about 0.1 to about 0.4 pphr lubricant selected from the group consisting of synthetic waxes and distilled monoglycerides; from about 0.1 to about 0.4 pphr lubricant selected from the group consisting of N,N'-dioleoylethylenediamine and calcium stearoyl-2-lactylate; from about 0.15 to about 0.3 pphr unsaturated fatty monoamide; and from about 0.5 to about 2 pphr titanium dioxide concentrate.

4,879,139

METHOD OF MAKING A THIN FILM ELECTROLUMINESCENCE ELEMENT

Yoshinori Ootsuka; Kinya Atsumi, both of Okazaki; Masumi Arai, Nukata, and Tadashi Hattori, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Continuation-in-part of Ser. No. 937,482, Dec. 3, 1986, abandoned. This application Jun. 23, 1988, Ser. No. 212,023
Claims priority, application Japan, Dec. 25, 1985, 60-295656
Int. Cl.[4] B05D 3/06
U.S. Cl. 427—38 10 Claims



1. A method of forming a thin film electroluminescent element comprising the steps of:

forming a luminous body layer having a crystal basic material and a luminescence center, on a transparent base plate; and

doping an impurity within said crystal basic material so that the doped luminous body layer will emit light from said luminescence center in response to an inflow of electrons accelerated in an electric field;

forming a transparent electrode between said luminous body layer and said transparent base plate;

forming a rear electrode on said luminous body layer opposed to said transparent electrode in a way such that an electric field can be formed between said rear electrode and said transparent electrode;

at least one dielectric body film layer provided between at least one of said transparent electrode and said rear electrode, and said luminous body layer; and

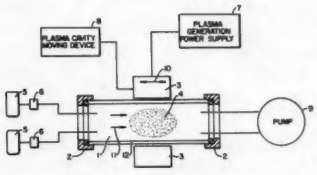
causing high energy particles to collide against a surface of the luminous body layer to destroy the crystal structure of at least a portion thereof and to form at least one electron inflow restraining layer in said luminous body layer in contact with said at least one dielectric body film layer, said electron inflow restraining layer restraining an inflow of said electrons from the interface of said luminous body layer with said dielectric body film layer into said luminous body layer.

4,879,140

METHOD FOR MAKING PIGMENT FLAKES

Howard R. Gray, Sebastopol; Richard P. Shimshock, and Matthew E. Krisl, both of Santa Rosa, all of Calif., assignors to Deposition Sciences, Inc., Santa Rosa, Calif.

Filed Nov. 21, 1988, Ser. No. 274,380
Int. Cl.[4] B05D 3/06
U.S. Cl. 427—38 22 Claims



1. A method for producing flakes of films, said method comprising providing a substrate within a chamber, creating a vacuum within the chamber, feeding a gas to the interior of the chamber, said gas being characterized as being capable of forming a plasma upon its exposure to a plasma generating device, creating a plasma within said chamber which, in turn, forms a film upon a surface of said substrate which is thereupon removed from the substrate as flakes which are then extracted from said chamber.

4,879,141

IN-REACTOR STABILIZATION OF POLYOLEFINS VIA COATED STABILIZERS

Ananda M. Chatterjee, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 147,953, Jan. 25, 1988. This application Dec. 27, 1988, Ser. No. 289,886
Int. Cl.[4] C08J 3/20; C09C 3/08
U.S. Cl. 427—213 12 Claims

1. A method for making a coated particulate comprising the steps of:

heating until liquid a polyolefin wax;

fluidizing with a hot gas, additive particles selected from the group comprising an antioxidant, a processing stabilizer, an acid acceptor, and mixtures thereof;

spraying the liquid polyolefin wax on the heated fluidized additive particles; and

maintaining the fluidized additive particles at a temperature which is sufficient to prevent the formation of fibers and adequate to form discrete substantially coated additive particles.

4,879,142
PROCESS FOR PREPARING A SILICON CARBIDE PROTECTIVE COATING

Volker Fey; Bernd Pachaly, and Norbert Zeller, all of Burghausen, Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

Filed Feb. 22, 1988, Ser. No. 158,813
Claims priority, application Fed. Rep. of Germany, Mar. 6, 1987, 3707224
Int. Cl.[4] B05D *3/02*
U.S. Cl. 427—227 5 Claims

1. A process for preparing a protective coating containing silicon carbide, which comprises applying a coating composition containing a copolymer obtained by reacting at least one disilane of the formula

$$R_2R^1Si_2(OCH_3)_3$$

in which R is selected from the group consisting of alkyl, alkenyl, aryl radicals and mixtures thereof and R^1 is an alkyl radical with at least one compound of the formula

$$R_2R^2SiH$$

in which R is the same as above and R^2 is selected from the group consisting of a methoxy radical and R, in the presence of at least one compound of the formula

$$MOR$$

in which R is the same as above and M is an alkali metal, and a compoud of the formula

$$HO[(R^1R^3SiO)_x(R^1{}_2SiO)_y]_nH$$

in which R^1 is the same as above, R^3 is an alkenyl radical, x is in the range of from 0.5 to 1.5, y is in the range of from 3 to 5 and n is in the range of from 500 to 2,000, to a substrate and thereafter pyrolyzing the coating in an inert atmosphere or in vacuo.

4,879,143
PROCESS FOR THE PRODUCTION OF FLOOR COVERING

Klaus Rang, Blaustein, Fed. Rep. of Germany, assignor to Rang KG Haus Moderner Fussboden, Blaustein, Fed. Rep. of Germany

PCT No. PCT/DE86/00493, § 371 Date Jul. 30, 1987, § 102(e) Date Jul. 30, 1987, PCT Pub. No. WO87/03578, PCT Pub. Date Jun. 18, 1987
PCT Filed Dec. 2, 1986, Ser. No. 93,743
Claims priority, application Fed. Rep. of Germany, Dec. 6, 1985, 3543184; Feb. 6, 1986, 3603664
Int. Cl.[4] B05D *3/00, 7/04, 7/06, 7/24*
U.S. Cl. 427—387 7 Claims

1. A process for the production of a floor covering which may be a floating covering, said process comprising:

mixing a granulated material and a hardenable plastic binder into a paste-like mass in such manner that individual particles of said granulated material are attached to each other only at certain points;

spreading said mass evenly upon a surface to be covered;

smoothing said spread mass;

hardening said smoothed and spread mass into said floor covering;

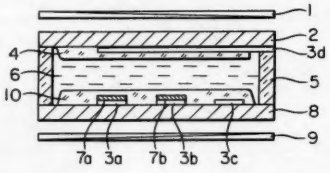
selecting prior to mixing, the proportion of said granulated material and binder so as to ensure that said surface to be covered is not wetted in a proportion of 40 to 70 % by the binder as the binder drips into hollow spaces existing between individual granules of the granulated material during the hardening step; and

applying to said hardened floor covering a second layer of water-emulsifiable synthetic resin including a hydraulic binding means, to achieve an increase in mechanical load which can be supported by the hardened floor covering.

4,879,144
LIQUID CRYSTAL ELEMENT

Yoshiyuki Nakura, Kawasaki, and Yasuo Kato, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 828,281, Feb. 11, 1986, abandoned.
This application Apr. 6, 1989, Ser. No. 333,771
Claims priority, application Japan, Feb. 19, 1985, 031040
Int. Cl.[4] G02F *1/13*
U.S. Cl. 428—1 15 Claims



1. A liquid crystal element, comprising:

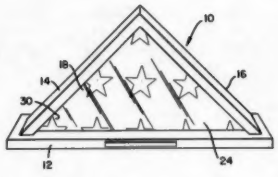
a pair of transparent substrates including a first substrate having disposed thereon a transparent electrode and an orientation controlling film and a second transparent substrate having disposed thereon a transparent electrode and an orientation controlling film:

a ferroelectric liquid crystal disposed between the pair of substrates, wherein at least one of the first or second substrates further comprises a color filter having a protecting layer which prevents the color filter from directly contacting the ferroelectric liquid crystal, said orientation controlling films comprising materials which are independently selected from the group consisting of polymides, polyvinyl alcohols and polyether amides.

4,879,145
MEMORIAL FLAG DISPLAY AND STORAGE CASE

Gordon McLellan, 32 Hawkins St., and Diane G. Wright, 1460 Elm St., B420, both of Stratford, Conn. 06497

Filed Nov. 6, 1987, Ser. No. 117,461
Int. Cl.[4] A47G *1/12;* E06B *3/64*
U.S. Cl. 428—14 7 Claims



1. In combination: a memorial flag folded into the shape of an isosceles triangle and a display and storage case therefor, said display and storage case comprising:

an elongated, flat base plate;

two elongated frame members joined together at one end and having their opposite ends mounted on said base plate,

said frame members being of substantially equal length and forming together with said base plate an isosceles triangular shaped opening of a size which is substantially identical to that of said folded flag,

the inner side wall of each frame member having a pair of elongated, spaced apart, parallel slots formed therein,

each one of said slots extending longitudinally along a marginal edge of said frame member;

a pair of substantially rigid, transparent panel members having the same isosceles triangular shape as that of said opening and being of a size which is slightly larger than said opening on two adjacent sides thereof;

said transparent panel members being mounted within said triangular shaped opening with said folded flag therebetween and having each of said larger adjacent sides thereof fitting snugly within one of said pair elongated slots formed in said frame members;

the third side of each transparent panel member resting on said base plate;

the spacing between said pair of elongated slots in each frame member being such that said transparent panel members are separated by a distance which is substantially less than the normal thickness of said flag when loosely folded prior to assembly within said case so that said flag is held under compression between said transparent panel members and maintained in an upright position therebetween without sagging or unfolding under its own weight;

the compressed and folded flag acting as a bias member urging said transparent panel members into sealing engagement with said slots along the edges of said two adjacent sides thereof, prohibiting the ingress of dust, moths and other foreign materials; and

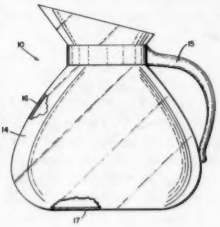
means for removably securing the opposite ends of said frame members to said base plate.

4,879,146

COFFEE CARAFE

Kendrick A. Johnson, 8242 Queen Ave. S., Bloomington, Minn. 55431

Filed Feb. 18, 1988, Ser. No. 157,746
Int. Cl.[4] A47J *27/00*; A47G *19/14*
U.S. Cl. 428—35.7 **11 Claims**



1. A coffee carafe suitable for heating on a hot plate having a temperature of at least 190° F., said carafe comprising a bowl and an integral handle being formed by blow molding and having a side wall thickness of between about 0.1 and 0.06 inches and a base thickness of between about 0.015 up to 0.06 inches, said side wall and said base consisting of unreinforced polyetherimide being heat stable to permit heating of said carafe on said hot plate, said polyetherimide having molecular weight of about 19,000 and glass transition temperature of at least 400° F.

4,879,147

POLYMERIC MULTILAYER SHEET SUITABLE FOR THE MANUFACTURE OF MICROWAVEABLE CONTAINERS

Frederick C. Newman, Weston, Conn., and Louis J. Marsella, Freemont, Calif., assignors to Continental Can Company, Inc., Norwalk, Conn.

Filed Jan. 15, 1987, Ser. No. 3,437
Int. Cl.[4] B27N *5/02*
U.S. Cl. 428--35 **12 Claims**

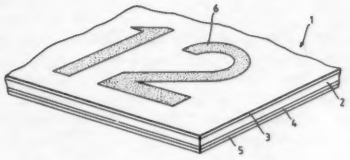
1. A multilayer plastic sheet suitable for the manufacture of containers which can withstand exposure to microwave heating of product contained therein without significant loss of dimensional stability, the sheet being comprised of at least one layer of a propylene polymer bonded to a styrene polymer layer, the propylene polymer layer having incorporated therein about 20 to about 40 percent by weight of an inorganic filler, the filled propylene polymer and styrene polymer layers having melt flows substantially equal to the other and the thickness of the layers being at a ratio of about 60:40 to 40:60.

4,879,148

MARKER ASSEMBLY

Bryan D. Neaves, Swindon; Frederick W. L. Hill, Lechlade, and Malcolm G. Cross, Deddington, all of England, assignors to Raychem Limited, England

Continuation of Ser. No. 20,798, Mar. 2, 1987, abandoned. This application Feb. 3, 1988, Ser. No. 157,073
Int. Cl.[4] B32B *5/16*
U.S. Cl. 428—40 **16 Claims**



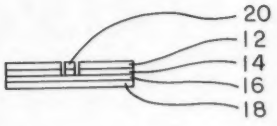
1. A marker assembly which comprises a support layer having a surface that is provided with a porous coating of a latent curable material that is capable of receiving printed indicia that can subsequently be cured to render the indicia substantially indelible, said porous coating being in particular and/or filamentary form.

4,879,149

BOOK BINDING REINFORCEMENT

Charles J. Barnett, Akron, Ohio, assignor to Kent Adhesive Products Co., Kent, Ohio

Filed Apr. 15, 1988, Ser. No. 182,221
Int. Cl.[4] B32B *3/10, 7/06, 7/10*
U.S. Cl. 428—41 **3 Claims**



1. A laminate for reinforcing a book binding comprising:

an elongated backing member longitudinally cut along the length thereof by a pair of parallel cuts spaced apart by 1/16–¼ inch;

an elongated face strip congruent with said backing member, said backing member and face strip being ¾–3¾inches wide;

an adhesive layer interconnecting said backing member and face strip; and

wherein removal of said backing member between said pair of parallel cuts exposes a thin line of adhesive for securing contacting engagement of said face strip to an edge of the book binding.

4,879,150

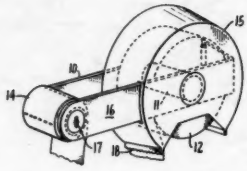
JUMBO ROLL OF TOILET TISSUE

Rudolph W. Schutz, Walnut Creek, and William Schultz, Piedmont, both of Calif., assignors to James River II, Inc., Oakland, Calif.

Continuation-in-part of Ser. No. 20,635, Mar. 2, 1987, abandoned, which is a division of Ser. No. 121,310, Nov. 16, 1987, Pat. No. 4,796,832. This application Oct. 17, 1988, Ser. No. 258,759

Int. Cl.[4] B32B *3/02*

U.S. Cl. 428—43 1 Claim



1. A roll of toilet tissue having a diameter between about 20 and 30 centimeters, the roll having an initial section corresponding to a roll diameter of between about 40 and 60 percent of the diameter of the roll and a remaining terminal section, the initial section being the section closest to the core and having transverse lines of perforations, and the terminal section being unperforated.

4,879,151

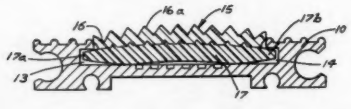
INSERT STRIP FOR A FLOOR COVERING STRUCTURE

Chester W. Ellingson, Jr., Burnsville, Minn., assignor to Reese Enterprises, Inc., Rosemount, Minn.

Filed Jun. 6, 1988, Ser. No. 202,255

Int. Cl.[4] B32B *3/06*

U.S. Cl. 428—53 8 Claims



1. In combination with a floor covering structure of coupled sections, each section having a central longitudinal channel having transversely opposed facing grooves, an insert strip in combination with said channel, said strip comprising

an upper layer portion formed as an extrusion of a fairly hard durometer plastic material,

an underlying layer portion of a durometer harder than that of said upper layer portion and co-extruded therewith,

said upper layer portion having a width to extend across the width of a channel of the floor covering section,

said underlying layer having a width extending beyond each side of said upper layer portion to project into grooves formed at each side of said channel,

said underlying layer portion having a substantially slick friction free surface, and

said upper layer portion having formed into its upper surface portion a figured surface treatment.

4,879,152

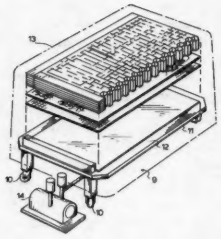
COMPOSITE PANEL STRUCTURE

Patrick H. Green, 29 Montressor Drive, Willowdale, Ontario, Canada (M2P 1Y9)

Filed Feb. 15, 1989, Ser. No. 310,661

Int. Cl.[4] B32B *3/12*

U.S. Cl. 428—73 12 Claims



2. A composite panel having:

(1) a first face comprising a first layer of cured polyester resin bonded to

(2) a second layer of cured polyester resin having embedded therein a fabric of woven roving fiberglass bonded by said second layer of cured resin to one side of

(3) a polypropylene core layer of thin wall, open cell, honeycomb structure, in turn bonded to

(4) a second face comprising a third layer of cured polyester resin having embedded therein a fabric of woven roving fiberglass, said third layer of cured polyester resin bonding said second face to the second side of said polypropylene core layer, and

(5) means to prevent resin from said second and third layers from penetrating through the cells of the honeycomb structure core.

4,879,153

INTEGRATED CIRCUIT CARD

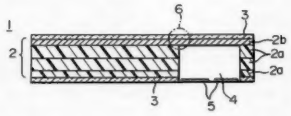
Masato Ohashi, Kobe, and Shiyojiro Kodai, Itami, both of Japan, assignors to Ryoden Kasei Co., Ltd. and Mitsubishi Denki Kabushiki Kaisha, both of, Japan

Filed Sep. 8, 1988, Ser. No. 241,895

Claims priority, application Japan, Oct. 20, 1987, 62-264953

Int. Cl.[4] B32B *1/04*; G09F *3/02*

U.S. Cl. 428—76 11 Claims



1. An integrated circuit card comprising:

an integrated circuit module housed entirely within the integrated circuit card, said module having a top surface and a bottom surface; and

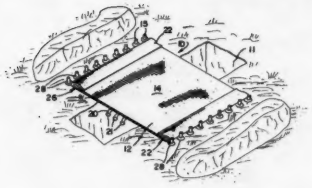
a laminated card body which comprises outer layers overlying opposite surfaces of a laminated core formed from a plurality of laminated sheets, said core having a hole formed therein in which said integrated circuit module is housed, one of said sheets being in direct contact with the bottom surface of said integrated circuit module, wherein at least the sheet which is in contact with the bottom surface of said integrated circuit module is made of synthetic paper.

4,879,154

REINFORCED UTILITY MAT ADAPTABLE AS MILITARY OVERHEAD FOXHOLE COVER AND FOOT SUSPENSION BRIDGE

Stephen H. Bennett, Alexandria, Va., assignor to United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 30, 1988, Ser. No. 292,076
Int. Cl.[4] B32B *3/06*
U.S. Cl. 428—81 **10 Claims**



1. A portable mat assembly for combat soldiers suitable for battlefield emplacement preferably as an overhead cover assembly for supporting a load of loose or sandbagged soil over a foxhole battle position up to about 36 inches in width to provide occupants of the position protection against high velocity ballistic fragments and blast overpressure produced by near-miss indirect fire, but also adaptable for use as camouflage, as a foot bridge across a narrow ravine or ditch, or as revetment, or any other general utilitarian function, wherein said mat assembly comprises:

a. soil supporting means including a durable, rectangular fabric main body panel or membrane;

b. a support reinforcing net disposed beneath said fabric body membrane, substantially fully co-extensive therewith, said support net comprising a first plurality of parallel longitudinally extending principal load carrying and reinforcing straps and a second plurality of transversely disposed parallel bracing straps extending transversely of and interconnecting with said principal straps;

c. said principal straps having loops formed at opposite ends thereof for reception of stakes thereby providing means for anchoring said reinforcing net in stretched taut relation over a foxhole or trench;

d. fold-up straps means including plural pairs of separable connectable strap members at least portions of which are operatively connected with and extend laterally from opposite generally medial portions of said coextensively disposed net and body membrane where by when at least a pair of longitudinally spaced fold-up straps are connected to each other above said body membrane panel of said mat assembly, said body membrane will be folded up along opposite sides to form a trough or pocket to help retain and minimize spillage of soil supported by said mat assembly; and

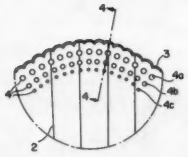
e. wherein said fabric membrane is provided with deadman sleeve members on opposite ends thereof whereby when said sleeve members are filled with logs or loose soil and covered with additional loose soil an anchoring effect will be provided.

4,879,155

PLEATED CLOTH AND METHOD FOR PRODUCING THE SAME

Mitsuo Fujisawa, 1-6, Maeishiki 1-chome, Gifu-City, Japan (500)

Filed May 26, 1987, Ser. No. 54,265
Claims priority, application Japan, May 27, 1986, 61-121894
Int. Cl.[4] D06C *23/04, 25/00;* D06H *7/22;* D06Q *1/00*
U.S. Cl. 428—131 **2 Claims**



1. Improved pleated cloth made of thermoplastic fibers comprising

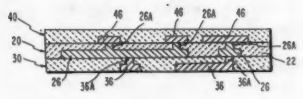
(1) a strip-like film edge and (2) a film-like section in parallel alignment with said edge, said edge and said pattern section each having been formed by ultrasonic melting and said pattern section being substantially free of pleats.

4,879,156

MULTILAYERED CERAMIC SUBSTRATE HAVING SOLID NON-POROUS METAL CONDUCTORS

Lester W. Herron; Robert O. Lussow; Robert W. Nufer, all of Hopewell Junction; Bernard Schwartz, Poughkeepsie; John Acocella, Hopewell Junction, and Srinivasa N. Reddy, Lagrangeville, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 859,092, May 2, 1986, Pat. No. 4,753,[illegible].
This application Mar. 14, 1988, Ser. No. 167,607
Int. Cl.[4] B32B *9/00*
U.S. Cl. 428—137 **12 Claims**



1. A multilayer ceramic substrate having a network of exposed and encapsulated metal conductors adapted for mounting and interconnecting a plurality of electronic devices exterior thereof consisting solely of;

a monolithic sintered ceramic body,

an exposed pattern of solid metal conductors on the surface of said body,

a plurality of spaced-apart planar patterns of solid metal conductors encapsulated in said body, each of which has a predetermined configuration, and

means provided conducting pathways between predetermined areas of said spaced-apart planar patterns and between predetermined areas of said spaced-apart planar patterns and predetermined areas of said exposed pattern of solid metal conductors;

wherein the ceramic material has a lower sintering temperature than the melting point of said metal conductors; and

wherein said ceramic substrate has been sintered at a temperature less than the melting point of said metal conductors but high enough to densify the ceramic material, while simultaneously restraining the ceramic substrate from shrinkage in the X and Y directions.

4,879,157

PLATE MADE OF INSULATING MATERIAL, IN PARTICULAR MINERAL FIBERS

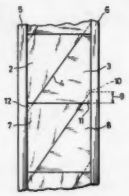
Manfred Pankatz, Geldern, Fed. Rep. of Germany, assignor to Deutsche Rockwool Mineralwoll GmbH, Gladbeck, Fed. Rep. of Germany

Continuation of Ser. No. 811,301, Dec. 16, 1985, abandoned, which is a continuation of Ser. No. 481,447, Sep. 15, 1982, abandoned. This application Jul. 27, 1987, Ser. No. 52,756

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1981, 3136924; Feb. 3, 1982, 3203624

Int. Cl.[4] B32B *3/02*

U.S. Cl. 428—157 9 Claims



9. Plate as defined in claim 1, wherein said body includes a plurality separate parts formed by said at least one continuous cut so that when they are inserted loosely in one row into the space between the supports and then displaced relative to one another during mounting in said direction along said longitudinal sides, protruding tip portions are formed, and said mineral fiber insulating material is compressible so that said protruding tip portions are compressed.

4,879,158

MASKING MEMBER

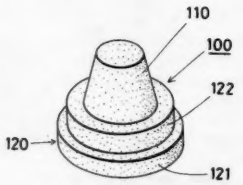
Seinosuke Horiki; Reiji Makino, both of Nagoya, and Hisami Iwata, Aichi, all of Japan, assignors to Nagoya Oilchemical Co., Ltd. and Toyota Jidosha Kabushiki Kaisha, both of Aichi, Japan

Filed Aug. 3, 1987, Ser. No. 81,295

Claims priority, application Japan, Aug. 6, 1986, 61-120518[U]

Int. Cl.[4] B32B *1/00;* B05C *21/00*

U.S. Cl. 428—159 2 Claims



1. A solid plug type masking member adapted for insertion into an opening to mask the opening and periphery thereof comprising a unitary structure providing a tapered solid plug portion and double flange end portion, the tapered solid plug portion having a relatively small end and a relatively large end, said tapered plug portion uniformly increasing in diameter from said small end to said large end, said double flange portion being fixed to said relatively large end and said tapered plug portion, the double flange end portion comprising a relatively small flange larger in diameter than the large end of said tapered plug portion on which said small flange is provided and a relatively large flange larger than and directly superposed on said small flange, said masking member being comprised of polystyrene foam, the outside dimension or periphery of said small flange when said masking member is inserted into said opening being larger than the opening into which said tapered plug portion is inserted.

4,879,159

DECORATIVE FOAMED GLASS WITH DENSE GLASS SURFACE LAYER AND METHOD OF PRODUCING SAME

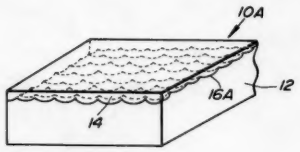
Toshiharu Furuuchi, Takaishi, Japan, assignor to Central Glass Company, Limited, Ube, Japan

Filed Aug. 26, 1988, Ser. No. 239,197

Claims priority, application Japan, Aug. 31, 1987, 62-215199

Int. Cl.[4] B32B *3/00, 3/26;* B29C *27/60*

U.S. Cl. 428—161 14 Claims



1. A foamed glass plate comprising a foamed glass layer which has a wavy surface, and a dense glass surface layer which is transparent or translucent and tightly bonds to said wavy surface of said foamed glass layer.

4,879,160

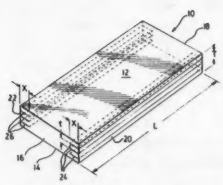
EDGE STABILIZED WOOD COMPOSITE PANEL

Robert M. Knudson, Coquitlam, and Hubert Ehrenfellner, Surrey, both of Canada, assignors to MacMillan Bloedel Limited

Filed Jul. 15, 1988, Ser. No. 219,308

Int. Cl.[4] B32B *23/02*

U.S. Cl. 428—192 8 Claims



1. A composite wood panel formed of wood particles coated with a adhesive and consolidated under elevated temperature and pressure conditions and having a pair of face surfaces, a pair of lateral side edges and a pair of transverse end edges, said panel including a pair of laterally spaced side portions distinct from a central portion of said panel between said spaced side portions in that each of said side portions has a stability enhancing additive incorporated substantially throughout its volume, said side portions extending substantially the full thickness of said panel as determined by spacing between said face surfaces in areas positioned one adjacent each lateral side edge of said panel, each said area having a lateral inside edge and a lateral outside edge, each said area extending substantially the full length of said panel between said pair of transverse end edges and each said area having a width determined by the spacing between its said lateral inside edge and its said lateral outside edge, said lateral outside edge of one of said areas being positioned substantially at one of said panel side edges and said lateral outside edge of the other of said areas

being positioned substantially at the other of said panel lateral side edges and said width of each of said areas measured perpendicular to the said thickness being at least one inch.

4,879,161

METHOD FOR PRINTING A DOUBLE-SIDED DISPLAY ON TRANSPARENT FILM

Geri L. Raymond, and Mark A. Raymond, both of 3475 S. Quay St., Lakewood, Colo. 80227

Filed Nov. 16, 1987, Ser. No. 121,336
Int. Cl.[4] B32R *9/00*
U.S. Cl. 428—195 **7 Claims**

1. A reusable display which can be electrostatically adhered to a transparent support surface which allows the display to be equally viewed from either side of the surface, the display being comprised of:

(a) a thin transparent carrier sheet of electrostatic adhering material;

(b) a plurality of semi-opaque coatings applied to only one side of said transparent carrier sheet and arranged to form a design, each of said coatings being applied directly to the carrier sheet in an edge abutting, non-overlapping configuration whereby the design can be seen with equal clarity from either side of the support surface.

5. A reusable display as defined in claim 1 which further includes a cover sheet applied to the opposite side of said transparent carrier sheet from the coating side to prevent the contamination and maintain the cleanliness of the surface of the transparent carrier sheet which will be applied to the transparent support surface.

4,879,162

BURYABLE WARNING TAPE

James B. Hansen, Sr., 2010 E. Old Elm Rd., Lindenhurst, Ill. 60046

Filed Mar. 24, 1988, Ser. No. 172,487
Int. Cl.[4] B32B *3/00, 27/14*
U.S. Cl. 428—196 **14 Claims**

1. A buryable warning tape which comprises a length of woven plastic fabric, visible indicia printed on a first face of said fabric in ink which is essentially nondegradable during burial, and a transparent, plastic coating bonded to and covering said first face.

4,879,163

TEXTILES CONTAINING INTERSTICES AND PROCESSES FOR MAKING SUCH TEXTILES

D. Mark Woiceshyn, St. Catharines, Canada, assignor to Bay Mills Limited, St. Catharines, Canada

Filed Sep. 24, 1987, Ser. No. 100,455
Int. Cl.[4] B32B *27/14*
U.S. Cl. 428—198 **23 Claims**

1. A process for making a textile comprising the steps of:

selecting a yarn comprising a plurality of filaments;

dispersing unexpanded microspheres and a resin within such yarn;

causing interstices to be dispersed in said yarn by expanding said microspheres, thereby placing filaments of the yarn in spaced apart relationship relative to each other; and

setting such resin while filaments are so separated, thereby holding filaments in spaced apart relationship to each other.

4,879,164

LAMINATED COMPOSITE OF A RIGID POLYISOCYANURATE SUBSTRATE AND METAL, PLASTIC, CELLULOSE, GLASS, CERAMIC OR COMBINATIONS THEREOF

Usama E. Younes, Newtown Square, Pa., assignor to Arco Chemical Technology, Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 86,009, Aug. 17, 1987, abandoned. This application Apr. 25, 1988, Ser. No. 185,648
Int. Cl.[4] B32B *9/00*
U.S. Cl. 428—209 **30 Claims**

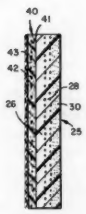
1. A laminated composite which comprises forming in combination in a mold at least one layer of a rigid polyisocyanurate thermoset composition prepared by reacting in said mold at temperature of from about ambient to about 140° C. ,a reaction mixture of an organic di- or polyisocyanate and from about 2 to about 50 parts by weight of a cyclic alkylene carbonate, based on the isocyanate-carbonate mixture, and a soluble adduct of a tertiary amine and a cyclic alkylene carbonate as catalyst at a concentration of from about 0.005 to about 3.0 weight percent based on the total composition and at least one layer of material selected from the group consisting of metal, cellulose, plastic, glass and ceramic or combination thereof.

4,879,165

LIGHTWEIGHT ARMOR

W. Novis Smith, 412 S. Perth St., Philadelphia, Pa. 19147

Filed Jun. 20, 1988, Ser. No. 208,969
The portion of the term of this patent subsequent to Mar. 22, 2005, has been disclaimed.
Int. Cl.[4] B32B *7/02*; F41H *1/02*; E06B *9/00*; E04B *2/02*
U.S. Cl. 428—212 **13 Claims**



1. An armor structure or high impact structure comprising a plurality of zones, at least one zone comprising an extruded ionomer resin, said zone of ionomer resin having incorporated therein a fibrous structure comprising an aramid and/or linearly crystallized polyethylene arranged in an amount and direction to transfer impact forces laterally, said zones being arranged in zones of decreasing Young's modulus and increasing elongation characteristics.

4,879,166

CARRIER MEDIUM FOR A COLORING MATTER

Katsutoshi Misuda, and Takafumi Hasegawa, both of Yokohama, Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 216,016
Claims priority, application Japan, Jul. 7, 1987, 62-167808
Int. Cl.[4] B41M *5/00*
U.S. Cl. 428—212 14 Claims

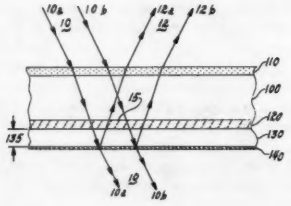
1. A carrier medium for a coloring matter, which comprises a substrate having thereon a particulate ink absorbent, and a substance selected from the group consisting of alumina, alumina hydrate and pseudo-boehmite present on the surface of the absorbent, which substance has an adsorptivity of from 20 to 100 mg/g.

4,879,167

REAL TIME HOLOGRAPHIC FILTER USING NONLINEAR OPTICAL MATERIALS

Byung J. Chang, Ann Arbor, Mich., assignor to Kaiser Optical System, Inc., Ann Arbor, Mich.

Filed Aug. 25, 1987, Ser. No. 89,082
Int. Cl.[4] B32B *9/00, 17/10;* G02B *5/18*
U.S. Cl. 428—215 13 Claims



1. A laser protection device for protection against laser illumination having a coherence length exceeding a minimum expected coherence length, said laser protection device comprising:

a layer of a nonlinear optical material having an index of refraction dependent upon light intensity;

a layer of transparent optical material having a first surface disposed adjacent to said layer of nonlinear optical material and a second opposed surface, and having a thickness greater than the coherence length of the expected ambient light but less than the minimum expected coherence length of the laser illumination; and

a partially reflecting layer disposed on said second surface of said layer of transparent optical material for partially reflecting and partially transmitting incident light.

4,879,168

FLAME RETARDING AND FIRE BLOCKING FIBER BLENDS

Francis P. McCullough, Jr.; Frank W. Hale, both of Lake Jackson; R. Vernon Snelgrove, Damon, all of Tex., and David M. Hall, Auburn, Ala., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 28, 1987, Ser. No. 114,324
Int. Cl.[4] B32B *9/00;* D02G *3/00;* D04H *1/00*
U.S. Cl. 428—224 15 Claims

1. A fire retarding and fire blocking structure comprising an intimate blend of non-carbonaceous fibers selected from the group consisting of natural and synthetic fibers and at least 7.5% by weight of heat set carbonaceous fibers having a LOI value greater than 40, said heat set carbonaceous fibers having a nitrogen content of about 5 to 35% and being derived from heat treated stabilized acrylic fibers.

4,879,169

QUILTED ELASTIC COMPOSITE FABRIC

Dimitri P. Zafiroglu, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 11, 1988, Ser. No. 179,620
Int. Cl.[4] D03D *3/00*
U.S. Cl. 428—230 8 Claims

1. A quilted composite fabric having a thickness of at least 6 mm, a unit weight of at least 75 g/m^2, a density of no greater than 0.05 g/cm^3 and stretchability of at least 25% in at least one direction, the composite fabric comprising

a gathered fibrous layer,

an elastic fabric layer containing elastic spandex fiber which amounts to between ½ and 10% of the weight of the elastic fabric layer and no more than 5% of the total weight of the quilted composite,

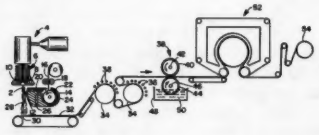
the layers being quilted with thread that forms spaced-apart patterns of stitches extending along the composite fabric.

4,879,170

NONWOVEN FIBROUS HYDRAULICALLY ENTANGLED ELASTIC COFORM MATERIAL AND METHOD OF FORMATION THEREOF

Fred R. Radwanski, Norcross, Ga.; Lloyd E. Trimble, Dustin, Okla.; Roland C. Smith, Gainesville, and Linda A. Connor, Atlanta, both of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Mar. 18, 1988, Ser. No. 170,196
Int. Cl.[4] B32B *1/04*
U.S. Cl. 428—233 27 Claims



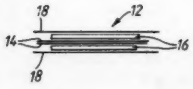
1. A nonwoven fibrous elastomeric web material comprising a hydraulically entangled admixture of (1) a first component of meltblown fibers and (2) a second component of at least one of pulp fibers, staple fibers, meltblown fibers and continuous filaments, at least one of the first component and the second component being elastic, said admixture having been subjected to high pressure liquid jets causing entanglement and intertwining of said first component and said second component so as to form an elastomeric web material.

4,879,171

THERMAL CAMOUFLAGE FABRIC

Robert F. Jeffrey, Bolton, England, assignor to J & D Wilkie Limited, United Kingdom

Filed Feb. 16, 1989, Ser. No. 311,722
Claims priority, application United Kingdom, Feb. 19, 1988, 8803965; Mar. 28, 1988, 8807325
Int. Cl.[4] B32B *7/00;* D03D *15/00*
U.S. Cl. 428—259 7 Claims



1. A thermal camouflage fabric comprising a heat reflective composite material which is coated on both of its sides with a protective material, the heat reflective composite material comprising at least one layer of a metal and at least one layer of a flexible support material, the protective material being

such that it protects the heat reflective composite material from damage and such that it has predetermined thermal emission characteristics, the protective material being securely bonded to the heat reflective composite material, and the thermal camouflage fabric being such that the heat reflective composite material is first formed from the said at least one layer of the metal and the said at least one layer of the flexible support material, and is then woven.

4,879,172

SUBTRATUM FOR SOIL-FREE CULTIVATION

Jean-Paul Meunier, deceased, late of Clermont, France (by Xavier Gillet, executor), assignor to Isover Saint-Gobain, Paris, France

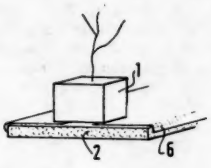
Division of Ser. No. 860,574, May 7, 1986, Pat. No. 4,769,277. This application Feb. 16, 1988, Ser. No. 155,738

Claims priority, application France, May 7, 1985, 85 06916

The portion of the term of this patent subsequent to Sep. 6, 2005, has been disclaimed.

Int. Cl.[4] D04H *1/08*

U.S. Cl. 428—280 **18 Claims**



1. Substratum for soil-free cultivation formed of a mineral fiber felt whose by-volume mass is less than 50 kg/m^3.

4,879,173

GLASS MAT WITH REINFORCING BINDER

Brian G. Randall, Stone Mountain, Ga., assignor to Georgia-Pacific Corporation, Atlanta, Ga.

Filed Jan. 6, 1988, Ser. No. 141,998

Int. Cl.[4] B32B *15/00*

U.S. Cl. 428—285 **11 Claims**

5. Gypsum board comprising a set gypsum core having adhered to at least one of its surfaces a non-woven glass fiber mat having a predetermined thickness and porosity and comprising glass fibers bound together by an adhesive and including also a reinforcing resinous binder on the surface of the mat and extending but partway through the thickness of the mat into the interstices thereof, so that said predetermined mat porosity is not significantly changed, the amount of the binder being such that the drying characteristics of the board are substantially the same as board comprising said mat without said binder.

4,879,174

DEVICE FOR EXPOSING COLORANT TO BE TRANSFERRED

Charles P. Marabella, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 10, 1986, Ser. No. 818,094

Int. Cl.[4] A61K *7/021, 9/70;* B32B *3/26*

U.S. Cl. 428—321.5 **5 Claims**

1. A device for exposing a colorant so as to enable said colorant to be transferred upon contact with a foreign surface, said device comprising a substrate having on at least one surface thereof a binder adhered to microcapsules containing a liquid, said microcapsules being present in an amount comprising 20 to 98% by weight of the combined weight of binder and microcapsules, said binder containing colorant which is wettable by said liquid, said binder being penetrable by said liquid, and said colorant being a lake.

5. A device for exposing a colorant so as to enable said colorant to be transferred to a surface, said device comprising

(1) at least two sheets bound by a single layer of a non-pressure sensitive adhesive composition layer,

(2) said adhesive composition layer containing a microcapsule having an average size of between 4 and 100 microns, said microcapsule containing a liquid therein and a colorant on the exterior wall of said microcapsule, at least 50% of the colorant associated with said microcapsule being exterior to said microcapsule and said liquid being capable of wetting said colorant, and the cohesive strength of the adhesive composition layer being less than the strength of the bond between said adhesive composition and said sheets, and the tensile rupture strength of said microcapsules being less than the cohesive strength of the adhesive composition.

4,879,175

DEVICE FOR EXPOSING COLORANT TO BE TRANSFERRED

Josef V. Ugro, Jr., Mahtomedi, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 11, 1985, Ser. No. 807,855

Int. Cl.[4] A61K *7021, 9/70;* B32B *3/26*

U.S. Cl. 428—321.5 **7 Claims**

1. A device for exposing a colorant so as to enable said colorant to be transferred to a surface, said device comprising

(1) at least two sheets bound by a single layer of a non-pressure sensitive adhesive composition layer,

(2) said adhesive composition layer containing a microcapsule of a dispersion of solid non-magnetic colorant material in a gel, waxy or low-temperature melting solid carrier phase encapsulated within a polymeric shell characterized by the fact that the surface of the solid material has adsorbed thereon a second material which increases the oleophilicity of the surface of the solid colorant material, and

(3) said microcapsules having an average diameter between 4 and 100 micrometers, the cohesive strength of the adhesive composition layer being less than the strength of the bond between said adhesive composition and said sheets, and the tensile rupture strength of said microcapsules being less than the cohesive strength of the adhesive composition.

4,879,176

SURFACE MODIFICATION OF SEMICRYSTALLINE POLYMERS

Andrew J. Ouderkirk; Douglas S. Dunn, and Robert W. Warner, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 25,845, Mar. 16, 1987, abandoned. This application Apr. 27, 1988, Ser. No. 186,813

Int. Cl.[4] B32B *27/00, 27/08*

U.S. Cl. 428—323 **36 Claims**

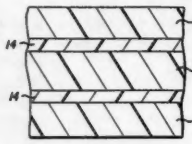
1. A polymer article comprising a semicrystalline polymer in the form of a layer, sheet, film or coating having on at least one surface thereof areas having thicknesses of at least 5 nm of the same polymer in a quasi-amorphous state, said areas comprising from 5% to 100% of said at least one surface, wherein said semicrystalline polymer comprises a polymer selected from the group consisting of poly(vinyl chloride), poly(vinylidene chloride), polytetrafluoroethylene, nylon, polyurethane, polyester, polyolefin, and copolymers thereof.

4,879,177

MONOAXIALLY ORIENTED SHRINK FILM

Peter R. Boice, Taylors, S.C., assignor to W. R. Grace & Co., Duncan, S.C.

Filed Nov. 13, 1987, Ser. No. 120,273
Int. Cl.[4] B32B 7/02
U.S. Cl. 428—339 5 Claims



1. A multilayer film, oriented in primarily one direction, comprising:

(a) a core layer comprising a copolyester;

(b) two outer layers each comprising ethylene propylene copolymer, polypropylene, or blends thereof; and

(c) two intermediate layers each bonding the core layer to a respective outer layer, and comprising an ethylene copolymer; and

(d) film having a shrink tension in the longitudinal direction in the range of between about 750 and 1200 p.s.i.

4,879,178

SURGICAL PRESSURE SENSITIVE ADHESIVE SHEET PRODUCT

Robert L. Sun, Stanhope, and James F. Kenney, Mendham, both of N.J., assignors to Johnson & Johnson Patient Care, Inc., New Brunswick, N.J.

Division of Ser. No. 2,316, Jan. 12, 1987, Pat. No. 4,762,888, which is a continuation-in-part of Ser. No. 634,716, Jul. 26, 1984, abandoned. This application May 27, 1988, Ser. No. 199,654
Int. Cl.[4] C09J 7/02, 7/04
U.S. Cl. 428—355 2 Claims

1. A surgical pressure sensitive sheet product comprising a flexible backing having supported thereon a hot melt pressure sensitive adhesive composition suitable for application to human skin, which by means of reversible hydrogen bond formation and dissociation possesses the reversible properties of both (i) strong cohesive strength at ambient temperature, and also (ii) a melt viscosity at elevated coating temperatures such that it can be used in hot melt coating equipment, said composition comprising:

A. from about 70 to 85 parts by weight of an acrylic copolymer having a low Tg in the range of from −20° C. to −80° C. comprising:

(a) from 85 to 95 parts by weight of an alkyl acrylate monomer wherein the alkyl group contains 4 to 12 carbon atoms and

(b) from 5 to 15 parts by weight of 1(2)-methyl-3-oxa-4-oxo-5-aza-nonyl methacrylate

B. from about 15 to 30 parts by weight of an acrylic copolymer having a high Tg in the range of from 10° C. to 40° C. comprising:

(a) from about 85 to 95 parts by weight of an alkyl methacrylate monomer wherein the alkyl group contains 1 to 12 carbon atoms and

(b) from about 5 to 15 parts by weight of 1(2)-methyl-3-oxa-4-oxo-5-aza-nonyl methacrylate.

4,879,179

ORGANIC REINFORCING FIBERS WITH BUNDLE SEPARATION DURING FIBER CUTTING

David S. Cordova, Midlothian, Va.; Hugh H. Rowan, Chapel Hill, N.C., and John A. Young, Chester, Va., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Aug. 27, 1986, Ser. No. 900,925
Int. Cl.[4] D02G 3/00
U.S. Cl. 428—361 15 Claims

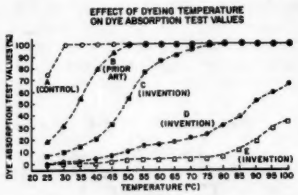
1. Synthetic multifilament yarn selected from the group consisting of polyester, aliphatic polyamide, aramid and olefin, for reinforcement of plastic composites, said yarn having been coated with a composition to enhance stiffness of the yarn for cutting and interfilament coherency and having deposited on the outer surface of the yarn 0.1 to 1.0 weight percent, based on weight of the yarn, of a partitioning agent selected from the group consisting of talc, alumina trihydrate, calcium carbonate, polyolefin powder or granules, and a metallic soap selected from the group consisting of calcium stearate, zinc stearate, lead stearate, magnesium stearate, and aluminum stearate, wherein said composition to enhance stiffness and interfilament coherency comprises an aqueous solution of carboxyl-terminated, oil-free alkyd resin based on aliphatic glycol or a glycol ether containing 2 to 12 carbon or carbon plus ether oxygen with a combination of aromatic di- or trifunctional carboxylic acids, said resins having a degree of esterification below the gel point of the resins.

4,879,180

STAIN-RESISTANT NYLON FIBERS

Randolph C. Blyth, Gulf Breeze, and Pompelio A. Ucci, Pensacola, both of Fla., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 180,589, Apr. 7, 1988, which is a continuation of Ser. No. 914,507, Oct. 2, 1986, Pat. No. 4,680,212, which is a continuation of Ser. No. 834,804, Mar. 3, 1986, abandoned, which is a continuation-in-part of Ser. No. 643,606, Aug. 23, 1984, abandoned, which is a continuation of Ser. No. 562,370, Dec. 16, 1983, abandoned. This application Nov. 7, 1988, Ser. No. 268,823
Int. Cl.[4] B32B 27/34
U.S. Cl. 428—395 5 Claims



1. A dyed nylon carpet fiber characterized in being coated with a sufficient amount of a sulfonated condensation product containing —SO_3X radicals, where X is hydrogen or a cation, such that when 64 ounces (1892.5 ml) of an aqueous solution of cherry flavored soft drink premix containing 0.054 grams per liter of Red Dye No. 40 is poured onto a carpet having a pile consisting of said fibers from a height of one meter and left overnight followed by washing of said pile for a removal of excess solution therefrom, no visual evidence of said Red Dye No. 40 remains on said pile.

4,879,181

SINTERED SPHERICAL PELLETS CONTAINING CLAY AS A MAJOR COMPONENT USEFUL FOR GAS AND OIL WELL PROPPANTS

Jeremiah J. Fitzgibbon, Lafayette, La., assignor to Carbo Ceramics Inc., Irving, Tex.

Continuation of Ser. No. 712,909, Mar. 15, 1985, abandoned, and a continuation-in-part of Ser. No. 347,210, Feb. 9, 1982, abandoned, which is a continuation of Ser. No. 565,429, Dec. 27, 1983, abandoned, which is a division of Ser. No. 405,055, Aug. 4, 1982, Pat. No. 4,427,068, which is a continuation-in-part of Ser. No. 347,210, Feb. 9, 1982, abandoned. This application Apr. 20, 1987, Ser. No. 40,534

Int. Cl.[4] B32B *18/00;* **C09K** *7/00*

U.S. Cl. 428—402 **14 Claims**

1. A gas and oil well proppant comprising a plurality of composite, sintered, spherical pellets having a permeability to brine at about 200° F. (93.3° C.) which deceases not more than about three-fourths when the applied pressure on said pellets is increased from 2,000 to 10,000 psi (140 to 700 kg/cm^2), said pellets being prepared from a mixture of calcined clay and calcined bauxite, said mixture containing at least 40 percent clay on a dry weight basis, and said pellets having an alumina to silica ratio on a dry weight basis from about 9:1 to 1.17:1, more than 6.12 weight percent of other than alumina and silica, a diameter of between 0.1 and about 2.5 millimeters, an apparent specific gravity of less than 3.40 but greater than 2.75 g/cc and a bulk density greater than 88 lbs./cubic ft.

4,879,182

METHOD OF COATING CARBON BODIES

J. Kenneth Presswood, and Alethea H. O'Quinn, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Oct. 24, 1988, Ser. No. 261,614

Int. Cl.[4] B32B *27/00, 27/06, 9/00*

U.S. Cl. 428—408 **15 Claims**

1. A method sealing monolithic carbon bodies which comprises

(a) applying to a vacuum-porous carbon body a coating formulation composed of a carbon-filled solution of a polyamic acid formed by reaction between pyromellitic acid dianhydride and a 2,2-bis[4-(aminophenoxy)phenyl]-hexafluoropropane, and

(b) heat curing the coated body to cause the polyamic acid to imidize into a thermally cured polyimide and thereby rendering the coated portion of the carbon body capable of holding a vacuum.

13. A normally vacuum porous carbon body having thereon a coating formed by (a) applying to a surface thereof a coating formulation composed of a carbon-filled solution of a polyamic acid formed by reaction between (a) pyromellitic acid dianhydride and a 2,2-bis-[4-(aminophenoxy)phenyl]hexafluoropropane, and (b) heat curing the coated body to cause the polyamic acid to imidize into a thermally cured polyimide and thereby rendering the coated portion of the carbon body capable of holding a vacuum.

4,879,183

METHOD TO MANUFACTURE A BLINDAGED GLASS

Jose R. Mannheim, Av. La Pradera 164, Lima, Peru

Filed Aug. 27, 1987, Ser. No. 89,994

Claims priority, application Peru, Jul. 8, 1987, 123453

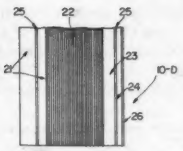
Int. Cl.[4] B32B *17/10, 27/40*

U.S. Cl. 428—437 **6 Claims**

1. Blindaged glass, comprising the following laminated parts:

a first and outer rigid impact scrifice sheet formed by a laminated glass sheet;

an intermediate and elastic expansion core adjoining said first and outer rigid impact element, said intermediate and elastic expansion core being formed by a smelted bulk of about eighteen to thirty smelted layers of polyvinyl butyral with about 0.5 inch to 0.8 inch in thickness; and



a third and rigid protective element adjacent to said intermediate and elastic core, said third and rigid protective element being formed by a laminated assembly of a glass sheet bonded with a last and outer polycarbonate sheet.

4,879,184

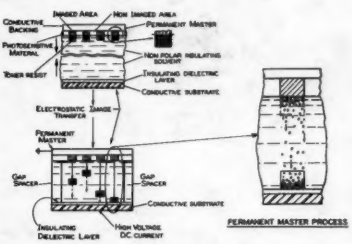
METHOD OF HIGH RESOLUTION OF ELECTROSTATIC TRANSFER OF A HIGH DENSITY IMAGE TO A RECEIVING SUBSTRATE

David P. Bujese, Butler, and Gary W. Schmidt, Park Ridge, both of N.J., assignors to Olin Hunt Specialty Products Inc., West Paterson, N.J.

Continuation-in-part of Ser. No. 158,168, Nov. 19, 1987, Pat. No. 4,786,576, which is a continuation of Ser. No. 883,797, Jul. 9, 1986, abandoned, which is a continuation of Ser. No. 848,669, Apr. 4, 1986, Pat. No. 4,661,431, which is a continuation-in-part of Ser. No. 655,346, Sep. 27, 1984, abandoned. This application Nov. 15, 1988, Ser. No. 271,456

Int. Cl.[4] G03G *13/22*

U.S. Cl. 430—126 **18 Claims**



1. A method of fabricating a toned pattern on a nonabsorbent receiving surface electrically isolated from ground, comprising the steps of:

(a) establishing a charged electrostatic latent image area on an electrostatically imageable surface;

(b) developing the electrostatic latent image area by applying to the electrostatically imageable surface charged toner particles suspended in a liquid comprised at least partially of a nonpolar insulating solvent to form a first liquid layer with a first liquid surface, the charged toner particles being directed to the latent image area of the electrostatically imageable surface to form a developed latent image of a predetermined pile height;

(c) applying to the nonabsorbent receiving surface a liquid comprised at least partially of a nonpolar insulating solvent to form a second liquid layer with a second liquid surface;

(d) establishing an electric field between the electrostatically imageable surface and the nonabsorbent receiving surface by connecting a D.C. voltage directly across a conductive electrode and the electrostatically imageable surface, the conductive electrode being connected to the nonabsorbent receiving surface;

(e) placing the nonabsorbent surface adjacent to the electrostatically imageable surface so that a gap is maintained therebetween and the first liquid surface contacts the second liquid surface to create a liquid transfer medium across the liquid-filled gap, the liquid-filled gap being of a depth greater than the pile height of the toner particles;

(f) transferring the developed latent image from the electrostatically imageable surface through the liquid to the nonabsorbent receiving surface to form a transferred toner particle image in an imaged area and define non-imaged areas where toner particles are absent;

(g) maintaining the gap during transfer of the developed latent image between the electrostatically imageable surface and the nonabsorbent receiving surface between at least about 1 mil and about 20 mils.

4,879,185

HEAT TRANSFER MATERIAL

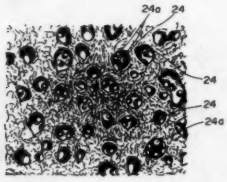
Yasuo Masuda, Urawa; Tsutomu Takahashi, Ohmiya; Yoshio Takizawa, Hasuda, and Naokazu Yoshiki, Kitamoto, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Japan

Continuation of Ser. No. 928,876, Nov. 7, 1986, abandoned. This application Jul. 20, 1988, Ser. No. 221,990

Claims priority, application Japan, Nov. 11, 1985, 60-252357; Nov. 11, 1985, 60-252358; Nov. 12, 1985, 60-253184; Feb. 22, 1986, 61-37736; Sep. 19, 1986, 61-221064; Sep. 19, 1986, 61-221065

Int. Cl.[4] F28F *13/18*

U.S. Cl. 428—687 **17 Claims**



1. A heat-transfer material comprising a body of metal, said body including on a surface thereof a porous electroplated layer having re-entrant cavities of generally cylindrical shape, said re-entrant cavities having on an inner surface thereof at least one internal cavity smaller in size than said re-entrant cavity.

4,879,186

PHOTOLUMINESCENT MATERIALS FOR OUTPUTTING REDDISH-ORANGE LIGHT AND A PROCESS FOR MAKING THE SAME

Joseph Lindmayer, Potomac, Md., assignor to Quantex Corporation, Rockville, Md.

Continuation-in-part of Ser. No. 870,809, Jun. 6, 1986, Pat. No. 4,830,875, which is a continuation-in-part of Ser. No. 786,095, Oct. 10, 1985, Pat. No. 4,705,952. This application Jan. 22, 1988, Ser. No. 147,215

Int. Cl.[4] B32B *9/00*; B05D *5/06*; C09K *11/08*; G03G *5/16*

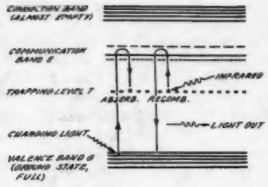
U.S. Cl. 428—691 **12 Claims**

1. An electron trapping photoluminescent infrared stimulable phosphor having a peak infrared sensitivity within the range of 1.12 to 1.22 microns and emitting in response to infrared radiation an output of reddish-orange light, comprising:

a base material comprising substantially calcium sulfide;

a first dopant of samarium provided in a quantity of between 20 and 300 parts per million by weight; and

a second dopant selected from the group of europium oxide, europium fluoride, europium chloride, and europium



sulfide provided in a quantity of between 300 and 1500 parts per million by weight.

4,879,187

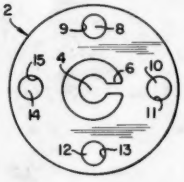
BATTERY TERMINAL FUSE

Dennis Biegger, North Ridgeville, Ohio, assignor to Eveready Battery Company, St. Louis, Mo.

Filed Oct. 22, 1987, Ser. No. 97,577

Int. Cl.[4] H01M *14/00, 2/26*

U.S. Cl. 429—7 **12 Claims**



1. An electrochemical cell comprising an active anode material and an active cathode material assembled in a container closed with a cover which has a terminal secured within and through said cover by a glass-to-metal seal and which terminal is a first terminal of the cell, which first terminal is insulated from a second terminal of the cell and wherein said first terminal is in electronic contact with one of the active materials and said second terminal is in electronic contact with the other active material; wherein a first electrode strip comprising the active cathode material superimposed on and overlapping a second electrode strip comprising the active anode material and a separator disposed between said first electrode strip and said second electrode strip are rolled into a coiled electrode assembly such that said first electrode strip is electronically insulated from said second electrode strip by said separator and an edge of at least one electrode strip protrudes from the coiled electrode assembly at one end and electronically contacts a conductive tab which tab in turn is secured to said first terminal in said cover; said conductive tab providing an electronic path between said first terminal and the active material in electronic contact with said first terminal, said conductive tab comprising a first conductive portion integrally connected to the remaining portion of the conductive tab by a narrow conductive strip, said first conductive portion being secured to said first terminal and said remaining portion of the tab being in electronic contact with the active material, and wherein the width of the narrow strip is selected so that if the current in the cell exceeds a predetermined amperage, the strip will burn and break the electronic path to said first terminal thereby producing an open circuit in the cell.

4,879,188

BYPASS ELEMENT FOR SAFEGUARDING BATTERY CELLS

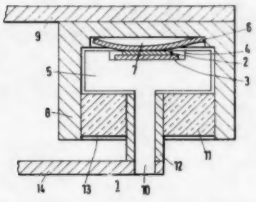
Henner Meinhold, Sandhausen; Botho Ziegenbein, Neckarsteinach, and Gunther Petri, Sandhausen, all of Fed. Rep. of Germany, assignors to BBC Brown Boveri Aktiengesellschaft, Mannheim, Fed. Rep. of Germany

Filed Jun. 30, 1988, Ser. No. 213,527

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1987, 3721754

Int. Cl.[4] H07M *14/00*; H02J *7/00*

U.S. Cl. 429—7 7 Claims



1. Bypass element for a battery having a plurality of series-connected groups of electrochemical battery cells, each group having a plurality of parallel-connected branches of battery cells based on alkali metal, chalcogen and an alkali ion-conducting solid electrolyte, the bypass element being connected in parallel with each respective battery cell or with each respective group of battery cells for safeguarding the battery cells by bypassing the cells when a predeterminable maximum charging capacity of the battery cells is reached, said bypass element comprising a series-connection of first and second semiconductor components, said components being capable of assuming a high-impedance and a low impedance state with different current/voltage characteristics in response to current or voltage applied to the cell, said first semiconductor component having a lower leakage current in the high-impedance state than said second semiconductor component, said second semiconductor component changing from the high-impedance to the low-impedance state at a higher voltage or higher current than said first semiconductor component, and said first semiconductor component changing from the high-impedance to the low-impedance state exactly when a maximum charging voltage of the battery cell or of the group of battery cells is reached, including a housing formed of an electrically conductive material, a fusible component disposed in said housing along with said semiconductor components, and positive and negative electrical connecting elements connected to said housing, each of said semiconductor components having first and second connecting terminals, the housing including an electrically conducting contact element in the form of a spring electrically conductively connecting said first connecting terminal of said first semiconductor component through said housing to said negative connecting elements of said housing, the housing further including a rod-shaped internal conductor directly electrically conductively connecting said second connecting terminal of said second semiconductor component to said positive connecting element of said housing, and said second connecting terminal of said first semiconductor component being electrically conductively connected to said first connecting terminal of said second semiconductor component.

4,879,189

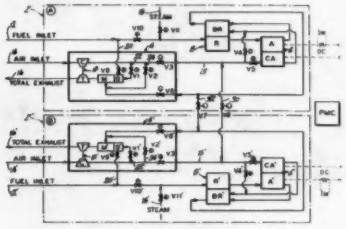
FUEL CELL AIR PRESSURIZATION SYSTEM AND METHOD

Daniel J. Snopkowski, Wethersfield, Conn., assignor to International Fuel Cells Corporation, South Windsor, Conn.

Filed May 27, 1988, Ser. No. 199,818

Int. Cl.[4] H01M *8/00*, *8/04*

U.S. Cl. 429—13 7 Claims



1. A fuel cell power station comprising:

(a) a plurality of fuel cell power modules each of which includes:

(i) a fuel processing subsystem for reforming raw hydrocarbon fuel to a hydrogen-enriched fuel gas;

(ii) an air pressurization subsystem for pressurizing air entering said modules to superatmospheric operating pressures and including a turbine-compressor;

(iii) a power generating subsystem for electrochemically generating electrical current from the hydrogen-enriched fuel gas and air;

(iv) a pressure air feed line conveying pressurized air from said compressor to said power generating system; and

(v) a reformer burner exhaust line conveying hot exhaust products to said turbine;

(b) means providing an interconnection between said air pressurization subsystems in at least two of said power generation modules including a first line interconnecting pressurized air fuel lines in the power generation modules, and a second line interconnecting the reformer burner exhaust lines in the power generation modules, whereby an air processing subsystem in one power generation module can provide pressurized air for more than one power generation module;

(c) valve means in said interconnection;

(d) sensor means for monitoring electric current output of said power generation modules; and

(e) control means operably connected to said sensor means, to said air pressurization subsystems and to said valve means, to open and close the latter when the electric current output of the power modules reaches predetermined less-than-full-load levels and to concurrently shut down or start up an air pressurizing subsystem in one of the power generation modules.

4,879,190

ELECTROCHEMICAL CELL

Jorgen S. Lundsgaard, Svendborg, Denmark, assignor to MHB Joint Venture, Dayton, Ohio

Filed Aug. 30, 1988, Ser. No. 238,071

Int. Cl.[4] H01M *6/10*

U.S. Cl. 429—94 21 Claims

1. An electrochemical cell comprising:

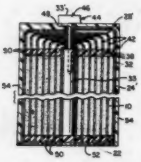
a relatively thin strip of anode material having flat opposing surfaces;

first and second electrolyte layers coated on said opposing surfaces;

first and second relatively thin strips of cathode material superposed to said first and second electrolyte layers,

respectively, thereby forming a cell laminate with said electrolyte layers and said anode strip;

a cathode current conductor strip; and



said cell laminate being deformed such that both said first and second strips of cathode material contact said cathode current conductor strip along substantially the entire lengths of said strips of cathode material.

4,879,191

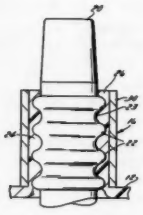
CRIMP TERMINAL FOR A BATTERY

John F. Sindorf, Pewaukee, Wis., assignor to Globe-Union Inc., Milwaukee, Wis.

Filed Mar. 23, 1989, Ser. No. 327,746

Int. Cl.[4] H01M *2/30*

U.S. Cl. 429—181 **5 Claims**



1. A battery having a casing with a top and at least one terminal post extending upward through an opening in said top;

(a) said terminal post having a plurality of separated ridges and recesses each substantially circumscribing said terminal post along one region thereof;

(b) a tubular member integral with said top and extending upward therefrom and mating along its internal surface with said ridges and recesses; and

(c) a collar positioned about and compressed against said tubular member with a substantially radially directed force sufficient to maintain said tubular member in a liquid-tight sealed interface with said terminal post along said one region thereof.

4,879,192

SECONDARY CELL

Shigeoki Nishimura, Katsuta; Kazunori Fujita, Toukai; Hiroyuki Sugimoto, Hitachi; Atsuko Tohyama, Hitachi; Noboru Ebato, Hitachi, and Shinpei Matsuda, Tohkai, all of Japan, assignors to Hitachi Ltd. and Showa Denka K.K., both of Tokyo, Japan

Filed Sep. 20, 1984, Ser. No. 652,476

Claims priority, application Japan, Sep. 21, 1983, 58-173056

Int. Cl.[4] H01M *6/16*

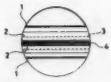
U.S. Cl. 429—198 **17 Claims**

1. A polymer secondary cell comprising:

a positive electrode;

a negative electrode, wherein at least one of said positive electrode and said negative electrode is composed of a polymer having conjugated double bonds; and

an electrolyte interposed between the positive and negative electrodes, wherein, during charging and discharging of said secondary cell, electrochemical reactions occur to form, as reaction products, radicals which can destroy said conjugated double bonds;



said secondary cell further comprising at least one of (1) radical scavengers which react with said radicals to remove said radicals prior to said radicals destroying the conjugated double bonds, and (2) adsorbents, other than polyacetylene, which adsorb the reaction products so as to prevent destruction of the conjugated double bonds, said at least one of (1) radical scavengers and (2) adsorbents being incorporated in at least one of the electrolyte and positive and negative electrodes.

4,879,193

LIGHT SENSITIVE MATERIAL FOR MAKING LITHOGRAPHIC PRINTING PLATE THEREFROM

Yoshikazu Takaya, and Kazuo Yokoyama, both of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed Mar. 16, 1988, Ser. No. 168,906

Claims priority, application Japan, Mar. 17, 1987, 62-63472

Int. Cl.[4] G03C *5/54, 1/80*

U.S. Cl. 430—14 **6 Claims**

1. A light sensitive material for making a lithographic printing plate therefrom by utilizing a silver complex diffusion process which comprises a polyester film made hydrophilic by coating with an organic copolymer as a support and at least one undercoat layer, a silver halide emulsion layer and an image receiving layer containing as physical development nuclei layer provided on said support in succession,

wherein an undermost layer contiguous to the support contains a polyfunctional epoxy compound having at least three epoxy groups in molecule and a gelatin.

4. A method for making a lithographic printing plate which comprises subjecting the light sensitive material of claim 1 to imagewise exposure and development with an alkali developer in the presence of a silver halide solvent.

5. A lithographic printing plate made by the method of claim 4, wherein said lithographic printing plate comprises the support, the undermost layer, the undercoat layer, the silver halide emulsion layer, and the image receiving layer containing the physical development nuclei layer.

4,879,194

TRI-LEVEL, HIGHLIGHT COLOR IMAGING USING TONOGRAPHY

Christopher Snelling, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 2, 1988, Ser. No. 189,871

Int. Cl.[4] G01D *15/06*

U.S. Cl. 430—53 **7 Claims**

1. Method of forming tri-level images, said method including the steps of:

using ion projection apparatus, forming a tri-level latent

electrostatic image on a charge retentive surfce which image comprises first and second image areas and a background area which are at discrete voltage levels;

electrically biasing a first developer member to a voltage level that is offset from said background area, in the direction of said first image area;

electrically biasing a second developer member to a voltage level that is offset from said background area, in the direction of said second image area;

using said first developer member, applying a first toner to said charge retentive surface for developing said first image area; and

using said second developer member, applying a second toner to said charge retentive surface for developing said second image area.

4,879,195

LASER-SENSITIVE ELECTROPHOTOGRAPHIC MATERIAL

Kunitaka Toyofuku, Sakura; Hiroaki Sato, Yonago, and Kohei Michikawa, Yokohama, all of Japan, assignors to Oji Paper Co., Ltd., Tokyo, Japan

Filed Dec. 16, 1988, Ser. No. 285,556

Claims priority, application Japan, Dec. 18, 1987, 62-318933

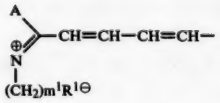
Int. Cl.[4] G03G 5/09

U.S. Cl. 430—89 **7 Claims**

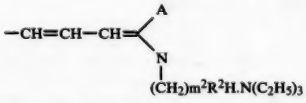
1. A laser-sensitive electrophotographic material comprising

(A) an electroconductive substrate; and

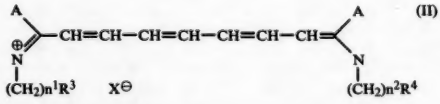
(B) a laser-sensitive electrophotographic layer formed on a surface of the substrate and comprising a finely divided photoconductive zinc oxide, a resinous binder, a sensitizing coloring material and a sensitizing assistant, said sensitizing coloring material comprising at least one member selected from the group consisting of the compounds of the formulae (I) and (II):



(I)



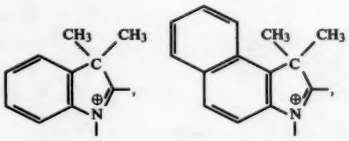
and

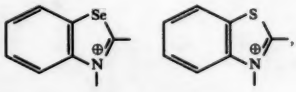


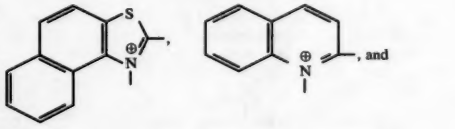
(II)

in which formulae m^1 and m^2 represent respectively and independently from each other, an integer of 1 to 8, R^1 and R^2 represent respectively, and independently from each other, a member selected from the group consisting of —COO and —SO_3 radicals, n^1 and n^2 represent respectively, and independently from each other, an integer of 1 to 8, R^3 and R^4 represent respectively, and independently from each other, a member selected from the group consisting of a hydrogen atom and —CH=CH_2 , —COOH, —SO_3H, —COONa, —SO_3Na, —COOK and —SO_3K radicals, X represents a member selected from the group consisting of chroline, bromine and iodine atoms and —$C10_4$ radical, the terminal group of the formula

is selected from the group consisting of and the terminal group of the formula

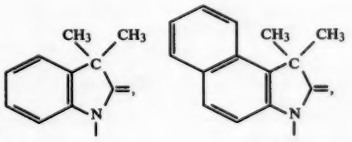


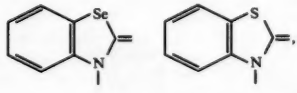




and the terminal group of the formula

is selected from the group consisting of





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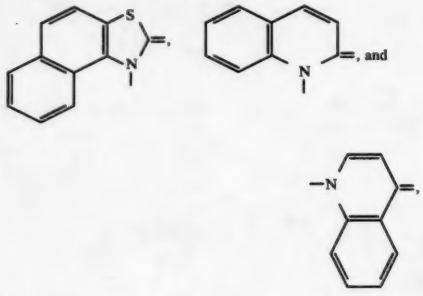
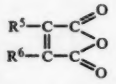


and the sensitizing assistant comprising at least one carboxylic acid anhydride of the formula (III):



(III)

wherein R^5 and R^6 represent respectively, and independently from each other, a member selected from the group consisting of a hydrogen atom and substituted and unsubstituted alkyl radicals having 1 to 8 carbon atoms and phenyl radical.

4,879,196

ELECTROPHOTOGRAPHIC METHOD FOR REVERSAL OR POSITIVE-POSITIVE IMAGE FORMATION

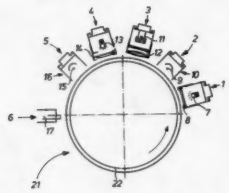
Jozef A. Van Biesen, Boechout; Guido F. Daes, Boom, and Jan B. Verstringe, Mortsel, all of Belgium, assignors to Agfa-Gevaert N.V., Mortsel, Belgium

Filed Jun. 18, 1987, Ser. No. 63,467

Claims priority, application European Pat. Off., Jul. 1, 1986, 86201151.7

Int. Cl.[4] G03G *13/22*

U.S. Cl. 430—100 **6 Claims**



1. An electrophotographic copying method for producing reversal copies from an original using a photoconductive recording material including a photoconductive layer by the steps of:

(I) uniformly exposing said photoconductive layer to light within its photosensitivity range and below the range wherein the ratio of the decrease in optical density (ΔD) of the photoconductive layer with respect to wavelength increment ($\Delta\lambda$ in nm) is at least 0.02,

(II) uniformly electrostatically charging said layer by means of a corona discharge,

(III) imagewise exposing the layer corresponding to said original to light of a wavelength shorter than the wavelength of the light used in step (I),

(IV) repeating step (I),

(V) repeating step (II), the extent of exposure and wavelength differences of the exposing light in steps (I) and (III) being such that step (V) results in the presence in those areas of the layer which were exposed in step (III) of electrostatic charges greater than the charges present in the unexposed areas thereof in step (III), and

(VI) developing the pattern of those greater charges by means of developer material comprising electrostatically charged toner particles of opposite sign to said greater charges.

4,879,197

METHOD OF DEVELOPING ELECTRONIC PHOTOGRAPH WITH LIQUID DEVELOPER AND CLEANING EXCESS THEREOF

Isao Kohmura; Takao Senga; Akira Furukawa; Hirokazu Yamamoto; Mamoru Nakatani, and Jun Yamada, all of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Continuation of Ser. No. 849,378, Apr. 8, 1986, abandoned. This application Sep. 27, 1988, Ser. No. 251,066

Claims priority, application Japan, Apr. 12, 1985, 60-78062; Jun. 4, 1985, 60-122329; Jun. 5, 1985, 60-123326; Jun. 11, 1985, 60-127668; Sep. 18, 1985, 60-207630

Int. Cl.[4] G03G *13/10*

U.S. Cl. 430—119 **10 Claims**

1. A process of developing images on a photosensitive material for electrophotography which includes the steps of developing the images with a liquid developer of the positive charge type containing a carrier liquid, a positive charge toner particle, a charge controlling agent which imparts positive charge to the toner particle and a compound having a polyoxyethylene group and removing an excess developer by means of a pair of squeeze rolls made of materials different from each other.

4,879,198

MAGNETIC CARRIER PARTICLES

Serge M. Tavernier, Lint; Joannes J. Van Beek, Ravels, and Pierre L. van Daele, Wilrijk, all of Belgium, assignors to AGFA-Gevaert N.V., Mortsel, Belgium

Filed Apr. 7, 1988, Ser. No. 178,929

Claims priority, application European Pat. Off., Apr. 24, 1987, 87200778

Int. Cl.[4] G03G *9/14*

U.S. Cl. 430—106.6 **13 Claims**

1. A particulate triboelectrically developer composition for the magnetic brush toner-carrier development of electrostatic charge patterns, which comprises finely divided toner particles and carrier particles, said carrier particles having a particle size of about 35–150 μm and comprising finely divided magnetite powder dispersed in a resin binder and said toner particles having a smaller particle size, wherein:

(1) said magnetite powder is a mixture of magnetites comprising one type (A) of magnetite having an oil absorption number in the range of 10 to 20 g/100 g pigment and another type (B) of magnetite having an oil absorption number in the range of 20 to 40 g/100 g pigment, the difference in said oil absorption numbers being sufficient to permit homogeneous distribution of said magnetite powder in said resin binder, the weight ratio of (A) to (B) being in the range of 0.3 to 3.0, and said magnetites both having a non-needle like shape and an average particle size in the range of 0.05 to 3 μm,

(2) said binder consists for at least 80% by weight of a resin that has a softening point above 80° C., contains hydrophilic functional groups and has an acid number in the range of 5 to 50 mg KOH/g, said resin being a partially cross-linked polyester resin produced by condensation reaction of at least one polyol of the group consisting of ethylene glycol, triethylene glycol and an alkoxylated bisphenol with at least one dicarboxylic acid of the group consisting of maleic acid, fumeric acid, itaconic acid,

malonic acid, and isophthalic acid, and a sufficient amount of a polyacid having at least 3 carboxylic acid groups to partially cross link said resin and to impart said acid number thereto, and

(3) said carrier particles have a size in the range of 20 to 150 μm, have a magnetite content of at least 70% by weight of the total carrier content, obtain an induced magnetic moment of at least 20 emu/g in an applied field of 1,000 gauss, have a remanence in emu/g of at least 3, and have a coercitivity in Oe at least 60.

4,879,199

PROCESS FOR PREPARING ENCAPSULATED COLOR TONER COMPOSITIONS

Robert J. Gruber, Pittsford; Raymond A. Yourd, III, Rochester; Paul C. Julien, West Webster; John F. Knapp, Fairport, and Steven B. Bolte, Rochester, all, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 764,023, Aug. 9, 1985, abandoned. This application Oct. 20, 1988, Ser. No. 262,249

Int. Cl.[4] G03G *9/08*

U.S. Cl. 430—137 **24 Claims**

1. A process for preparing encapsulated toner particles which comprises blending together resin particles, colored pigment particles, and a waxy substance with a molecular weight of from about 500 to about 20,000, micronizing the resulting mixture to form toner sized particles, and permitting the waxy substance to form an encapsulating continuous shell on the surface of the toner particles by subjecting the formed particles to heat spheroidization.

4,879,200

LIGHT-SENSITIVE MATERIAL CONTAINING SILVER HALIDE, REDUCING AGENT, POLYMERIZABLE COMPOUND, AND A QUATERNARY AMMONIUM DEVELOPMENT ACCELERATOR

Yutaka Oka, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

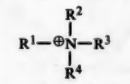
Filed Oct. 6, 1987, Ser. No. 105,157

Claims priority, application Japan, Oct. 6, 1986, 61-238871

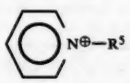
Int. Cl.[4] G03C *1/72, 11/12*

U.S. Cl. 430—138 **8 Claims**

1. A light-sensitive material comprising a light-sensitive layer containing silver halide, a reducing agent and an ethylenically unsaturated polymerizable compound provided on a support, wherein the light-sensitive layer contains a salt comprising a quaternary ammonium ion and an anion selected from the group consisting of a halogen ion, an acetate ion, a perchlorate ion, a sulfonate ion, an oxalate ion, a carbonate ion, a sulfite ion and a phosphoric hydrogen ion, said salt being contained in the light-sensitive layer in an amount of from 0.1 to 200 weight% based on the total silver content of the silver halide, and said quaternary ammonium ion having the following formula (I) or (II):



(I)



(II)

in which each of R^1, R^2, R^3 and R^4 independently is a monovalent group selected from the group consisting of an alkyl group, a cycloalkyl group, an alkenyl group, an alkynyl group, an aralkyl group, an aryl group, and an alkoxy group, each of which may have one or more substituent groups; R^5 is a monovalent group selected from the group consisting of an alkyl group, a cycloalkyl group, an alkenyl group, an alkynyl group, an aralkyl group, an aryl group and an alkoxy group, each of which may have one or more substituent groups; the pyridinium ring may be condensed with one or more benzene rings, and the pyridinium ring and the condensed pyridinium ring may have one or more substituent groups.

4,879,201

METHOD OF MAKING A LITHOGRAPHIC PLATE COMPRISING MICROCAPSULES

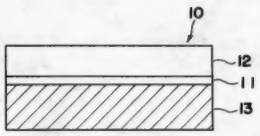
Akira Hasegawa, Kawashiri, Japan, assignor to Fuji Photo Film Co., Ltd., Miniami-ashigara, Japan

Filed Jan. 20, 1988, Ser. No. 145,839

Claims priority, application Japan, Jan. 20, 1987, 62-12095

Int. Cl.[4] G03C *1/72, 7/00*

U.S. Cl. 430—138 **12 Claims**



1. A process for the preparation of a lithographic plate comprising the steps of:

exposing imagewise to a radiation a presensitized lithographic plate which comprises a hydrophilic layer and a light-sensitive layer containing silver halide, a reducing agent, an ethylenically unsaturated polymerizable compound and a hydrophilic binder provided in order on a hydrophilic support wherein the silver halide, the reducing agent and the polymerizable compound are contained in lipophilic microcapsules which are dispersed in the light-sensitive layer;

heating the exposed light-sensitive layer for development simultaneously with or after the above step, whereby the polymerizable compound within the area where a latent image of the silver halide has been formed is cured by polymerization to form a polymer;

heating the developed layer to a temperature of not higher than a thermal softening point of the resulting polymer but not lower than a thermal softening point of shell material of the microcapsules, whereby the polymerizable compound within the area where a latent image of the silver halide has not been formed runs out of the microcapsules and is cured by polymerization; and

removing the microcapsules together with the hydrophilic layer from the area where a latent image of the silver halide was formed.

4,879,202

RADIATION IMAGE STORAGE PANEL AND PROCESS FOR THE PREPARATION OF THE SAME

Yuichi Hosoi, Chigasaki; Satoshi Arakawa, Minami-ashigara, and Kenji Takahashi, Odawara, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 13, 1987, Ser. No. 72,698

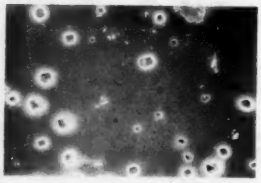
Claims priority, application Japan, Jul. 11, 1986, 61-163284; Feb. 2, 1987, 62-22032; Jul. 1, 1987, 62-166130; Jul. 3, 1987, 62-167630

Int. Cl.[4] G03C *5/16;* **G01T** *1/00;* **G01J** *1/58*

U.S. Cl. 430—139 **29 Claims**

1. A process for the preparation of a radiation image storage panel which has a phosphor layer comprising a stimulable phosphor, which comprises steps of molding a phosphor layer-forming material containing a stimulable phosphor into a sheet and sintering the molded product to form a phosphor layer.

25. A radiation image storage panel having a sintered stimulable phosphor layer which consists essentially of a sintered



stimulable phosphor, has a relative density of not less than 70%, and is binder free.

4,879,203

PROCESS FOR PRODUCING MASKED POSITIVE COLOR IMAGES BY THE SILVER DYE BLEACH PROCESS

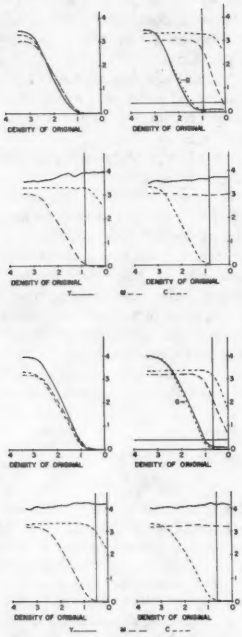
Urs J. Fürholz, Marly, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Filed Apr. 4, 1988, Ser. No. 177,344

Claims priority, application Switzerland, Apr. 6, 1987, 1313/87

Int. Cl.[4] G03C *5/52, 7/04*

U.S. Cl. 430—378 11 Claims



1. A process for producing masked positive colour images by the silver dye bleach process by exposure, development, dye bleaching, silver bleaching and fixing, with the use of a photographic material which, in each of at least two layers, contains a dye which can be bleached imagewise and the absorption maximum of which corresponds in each case to one of the three principal colours red, green and blue, each dye being associated with a silver halide emulsion layer sensitive in a defined spectral region and, in this material,

(a) the dye, the undesired secondary colour density of which is to be compensated, being associated with a silver halide emulsion layer consisting at least partially of silver iodide,

(b) at least one second dye, the principal colour density of which corresponds to a secondary colour density, which is to be compensated, of the first dye, and an iodide ion-free silver halide emulsion being present in a further layer,

(c) a further layer, adjacent to the layer (b), containing colloidal nuclei capable of depositing metallic silver from soluble silver complexes, if appropriate an insensitive, not spectrally sensitized iodide-free silver halide emulsion and, if appropriate, a development inhibitor, and

(d) a separating layer being present between the layers (a) and (c), and the developer solution, with which the material is treated, containing a complex former which is capable of producing water-soluble and diffusible silver complexes, wherein the developer solution contains 0.3 to 1.0 mol/l of a bromide as the complex former.

4,879,204

SILVER HALIDE PHOTOGRAPHIC ELEMENT CONTAINING ANHYDAZINE COMPOUND AND SPECIFIC DYES

Kunio Ishigaki; Toshiro Takahashi; Yuji Mihara; Keiichi Adachi; Shigeru Ohno; Masahiro Okada, and Naomi Saeki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 63,753, Jun. 22, 1987, abandoned, which is a continuation of Ser. No. 823,861, Jan. 29, 1986, abandoned. This application Aug. 16, 1988, Ser. No. 232,526

Claims priority, application Japan, Jan. 29, 1985, 60-14960; Feb. 1, 1985, 60-18445; Mar. 19, 1985, 60-54883; Mar. 22, 1985, 60-57942; Mar. 25, 1985, 60-60118

Int. Cl.[4] G03C *1/08*

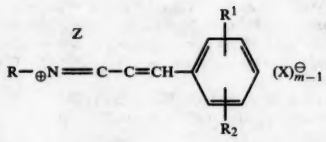
U.S. Cl. 430—512 16 Claims

1. A high contrast silver halide photographic material capable of producing an image having a contrast of higher than 10 in gamma rendered safe for development under a safe light comprising a support having formed thereon at least one silver halide emulsion layer and at least one light-insensitive hydrophilic colloid layer, wherein at least one of the layers consisting of at least one silver halide emulsion layer and said at least one light-insensitive hydrophilic colloid layer contains from 1×10^{-6} mol to 5×10^{-2} mol per mol of silver halide of hydrazine derivative selected from the group consisting of aryl hydrazines wherein a sulfinic acid residue is bonded to a hydrazo moiety and hydrazine derivatives of formula (XI)

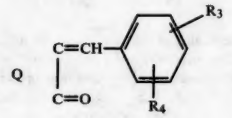
$$R_{51}\text{-NHNH-G-}R_{52} \qquad \text{(XI)}$$

wherein R_{51} represents an aliphatic or aromatic group, R_{52} represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, a substituted or unsubstituted alkoxy group, or a substituted or unsubstituted aryloxy group; and G represents a carbonyl group, a sulfonyl group a sulfoxy group, a phosphoryl group, or an N-substituted or unsubstituted imino group, and wherein at least one of said at least one light-insensitive hydrophilic colloid layer formed on the uppermost silver halide emulsion layer, but not said light sensitive silver halide emulsion layer, contains a dye having an absorption covering the wavelength region of the safe light n an amount of from 10^{-3} g/m^2 to 1 g/m^2, said dye being selected from the group represented by the formula (a), (b), (c), (d), (e) and (f):

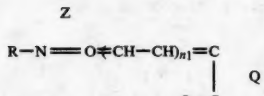
(a)



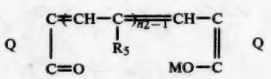
(b)



(c)

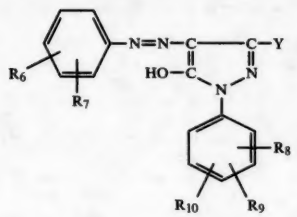


(d)

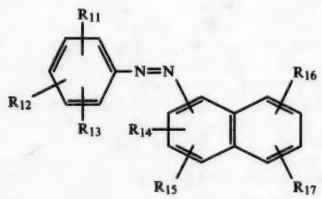


wherein Z represents a non-metallic atomic group necessary for forming heterocyclic nuclei of benzothiazole, naphthothiazole, or benzoxazole; Q represents an atomic group necessary for forming pyrazolone, barbituric acid, thiobarbituric acid, isoxazolon, 3-oxythionaphthene, or 1,3-indanedione; R represents a substituted or unsubstituted alkyl group; R_1, R_2, R_3 and R_4 each represents a hydrogen atom, an alkoxy group, a dialkylamino group or a sulfo group; R_5 represents a hydrogen atom or a halogen atom; M represents a hydrogen atom, a sodium atom; X represents an anion; m, n_1 and N_2 each represents 1 or 2 when m is 1, the dye forms an intramolecular salt;

(e)



(f)



wherein Y represents an alkyl group or a carboxy group; R_6, R_7, R_8, R_9, R_{10}, R_{11}, R_{12}, R_{13}, R_{14}, R_{15}, R_{16} and R_{17} each represents a hydrogen atom, an alkyl group, a hydroxy group, an amino group, an acylamino group, a carboxy group or a sulfo group; said R_{12} and R_{13} may combine with each other to form a benzene ring.

4,879,205

INFORMATION STORAGE MEDIUM AND A METHOD OF MANUFACTURING THE SAME

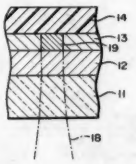
Katsumi Suzuki, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 15, 1987, Ser. No. 96,507

Claims priority, application Japan, Jan. 20, 1987, 62-10339; Jan. 20, 1987, 62-10340; Jan. 20, 1987, 62-10341; Jan. 20, 1987, 62-10342

Int. Cl.[4] G03C *1/72, 1/80*

U.S. Cl. 430—523 **14 Claims**



1. An information storage medium comprising:

a substrate;

a recording layer adapted to undergo phase transformation between different crystal phases when exposed to a light beam, said recording layer containing an InSb alloy;

a first protective layer interposed between said substrate and said recording layer; and

a second protective layer disposed on said recording layer;

said first and second protective layers including an amorphous silicon-containing material.

4,879,206

SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Masahiro Asami, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 892,014, Aug. 1, 1986, abandoned. This application Dec. 27, 1988, Ser. No. 290,201

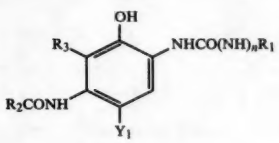
Claims priority, application Japan, Aug. 5, 1985, 60-172017

Int. Cl.[4] G03C *1/19, 1/20, 7/34*

U.S. Cl. 430—550 **4 Claims**

1. A silver halide color photographic material which comprises a support having provided thereon at least one silver halide emulsion layer containing a cyan dye image-forming coupler represented by the following general formula (I), said emulsion layer containing silver chlorobromide grains containing 40 to 95 mol % bromide in which tabular silver halide grains having a means aspect ratio of 5 to 8 amount to 85% or more based on the total projection area of the whole grains, and being spectrally sensitized with a cyanine dye of the trimethine or pentamethine type or a merocyanine dye, which dye has a desensitization degree of 10 or more,

(I)



wherein R_1 and R_2 each represents a substituted or unsubstituted aliphatic, aromatic or heterocyclic group; R_3 represents a hydrogen atom, a halogen atom, a substituted or unsubstituted aliphatic or aromatic group or an acylamino group, and further R_3 may be non-metallic atomic groups which form with R_2 a nitrogen-containing 5- or 6-membered ring; Y_1 represents a hydrogen atom, or a group which is eliminable upon an oxidative coupling reaction with a developing agent; and n represents 0 or 1; and further, the coupler may take a poly-

meric form, including dimeric form, via a group represented by R_1, R_2 or Y_1.

4,879,207

SAFELIGHT FOR SILVER HALIDE LIGHT-SENSITIVE PHOTOGRAPHIC MATERIAL

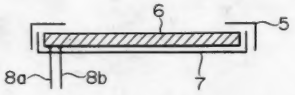
Kazuhiro Yoshida, and Yasuhiko Takamuki, both of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Apr. 12, 1988, Ser. No. 180,776

Claims priority, application Japan, Apr. 14, 1987, 62-92843; Apr. 14, 1987, 62-92844; May 28, 1987, 62-132753; Oct. 28, 1987, 62-274391

Int. Cl.[4] G03C *1/04*

U.S. Cl. 430—564 2 Claims



1. A method of handling a silver halide light-sensitive photographic material during at least one step in the manufacturing, using, or processing thereof, said method comprising handling said photographic material under light substantially free from wavelength components to which said photographic material is sensitive, said light being irradiated from a safelight apparatus comprising an electroluminescent element light source,

said safelight apparatus comprising a color filter layer positioned further from a light emission layer and a transparent electrode layer of said electroluminescent element.

4,879,208

PROCESS FOR PREPARING SILVER HALIDE GRAINS

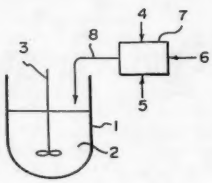
Shigeharu Urabe, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 18, 1989, Ser. No. 298,446

Claims priority, application Japan, Jan. 18, 1988, 63-007851

Int. Cl.[4] G03C *1/00*

U.S. Cl. 430—569 13 Claims



1. A process for manufacturing silver halide grains, which comprises the steps of:

(A) providing a mixer vessel and a reactor vessel, said mixer vessel being separate from said reactor vessel and said reactor vessel having contained therein an aqueous protective colloid solution and in which silver halide grains are grown;

(B) feeding an aqueous water-soluble silver salt solution, an aqueous water-soluble halide solution and an aqueous protective colloid solution into said mixer vessel;

(C) forming a fine silver halide grain-containing solution by mixing the thus fed solutions in said mixer vessel;

(D) immediately feeding the thus formed fine silver halide grain-containing solution into said reactor vessel; and

(E) stirring said solution in said reactor vessel to grow uniform silver halide grains therein.

4,879,209

PHOTOGRAPHIC PROTEINACEOUS LAYERS COMPRISING DEXTRAN DERIVATIVES

Joan T. Vermeersch, Deinze; Daniël Timmerman; Hubert Vandenabeele, both of Mortsel, and Jacques L. Vervecken, Berchem, all of Belgium, assignors to AGFA-GEVAERT, N.V., Mortsel, Belgium

Filed Dec. 15, 1987, Ser. No. 133,080

Claims priority, application European Pat. Off., Dec. 23, 1986, 86202376.9

Int. Cl.[4] G03C *1/30*

U.S. Cl. 430—623 12 Claims

1. Method of hardening a proteinaceous layer of a photographic silver halide element by incorporating a modified dextran in said proteinaceous layer, wherein said modified dextran is a reaction product of dextran and at least one reagent selected from the group consisting of an alkyl haloformate, a substituted alkyl haloformate, an aryl haloformate, and a substituted aryl haloformate.

4,879,210

METHOD AND APPARATUS FOR TEACHING SIGNING

Harley Hamilton, 626 Collingwood Dr., Decatur, Ga. 30032

Filed Mar. 3, 1989, Ser. No. 318,658

Int. Cl.[4] G09B *5/06*

U.S. Cl. 434—112 16 Claims

1. Apparatus for teaching signing including a tape having a story recorded thereon, said story being divided into a plurality of portions wherein each portion comprises an integrated part of said story, each said portion of said story being between natural breaks in said story, and further including a plurality of recordings of a person signing, each recording of said plurality of recordings of a person signing comprising a recording of a person signing a summary of one portion of said plurality of portions of said story, said recordings of a person signing being interspersed between said portions, a given portion and the summary of said given portion being juxtaposed.

4,879,211

RAPID IMMUNOAGGLUTINATION TEST FOR PRESENCE OF HIV IN BODY FLUIDS

Chang Y. Wang, Long Island, and James J. G. Wang, Flushing, both of N.Y., assignors to United Biomedical Inc., Lake Success, N.Y.

Filed Nov. 30, 1987, Ser. No. 126,269

The portion of the term of this patent subsequent to Apr. 5, 2005, has been disclaimed.

Int. Cl.[4] G01N *33/569*

U.S. Cl. 435—5 3 Claims

1. An immunoagglutination method for the detection of the presence of HIV body fluids comprising:

A. Preparing substantially pure polyclonal anti-HIV IgG from serum which had been previously determined to be positive for antibodies to HIV and negative to antibodies to HTLV-I, HBsAg, HBcAg and EBV by (i) affinity chromatography over a protein A column; wherein protein A is coupled to crosslinked agarose beads via chemically stable amide bonds; or (ii) salt precipitation followed by ion exchange chromatography;

B. Adsorbing the substantially purified polyclonal anti-HIV IgG on to carboxylate modified latex beads having a particle size of about 1 um in diameter;

C. Mixing on a slide, a drop of unknown serum with a drop of 0.01M PBS buffer at a pH of about 7.0;

D. Mixing on a second slide, a drop of normal serum with the same buffer;

E. Adding to each slide a drop of 0.01M PBS buffer containing from about 0.12% weight:volume of the latex beads absorbed with purified polyclonal anti-HIV IgG;

F. Allowing the slides to incubate at room temperature for about 0.5 minutes to about 2.5 minutes;

G. Examining the slides within about three minutes from

step (E) to determine the degree of agglutination, of the unknown serum sample compared to the normal serum wherein the presence of virus is shown by the agglutination of the latex beads to from larger particles.

4,879,212

PEPTIDE COMPOSITION AND METHOD FOR THE DETECTION OF ANTIBODIES TO HTLV-III

Chang Y. Wang, Great Neck, and James J. G. Wang, Flushing, both of N.Y., assignors to United Biomedical Inc., Lake Success, N.Y.

Continuation-in-part of Ser. No. 847,102, Apr. 2, 1986, Pat. No. 4,735,896, which is a continuation-in-part of Ser. No. 837,566, Mar. 4, 1986, abandoned, which is a continuation-in-part of Ser. No. 774,644, Sep. 11, 1985, abandoned. This application Feb. 10, 1987, Ser. No. 13,014

The portion of the term of this patent subsequent to Apr. 5, 2005, has been disclaimed.

Int. Cl.[4] C12Q *1/70;* **G01N** *33/53*

U.S. Cl. 435—5 **52 Claims**

1. A peptide composition having specific immunoreactivity to antibodies to HTLV-III comprising a peptide with about 35 amino acids having an amino acid sequence:

Arg-Ile-Leu-Ala-Val-Glu-Arg-Tyr-Leu-Lys-Asp-Gln-Gln-Leu-Leu-Gly-Ile-Trp-Gly-Cys-Ser-Gly-Lys-Leu-Ile-Cys-Thr-Thr-Ala-Val-Pro-Trp-Asn-Ala-Ser , or analogues thereof, as long as the immunoreactivity to antibodies to HTLV-III derived from the three dimensional conformation is preserved substantially.

4. An immunoassay method for the detection of antibodies to HTLV-III and diagnosis of AIDS, ARC or pre-AIDS conditions comprising:

A. coating a solid support with an effective amount of the peptide composition according to claim 1 as an antigen;

B. Adding a test sera diluted with a buffer wherein the antibodies to HTLV-III in the test sera form peptide-antibody complexes with the peptide composition;

C. incubating the mixture; and

D. detecting the presence of the peptide-antibody complexes.

4,879,213

SYNTHETIC POLYPEPTIDES AND ANTIBODIES RELATED TO EPSTEIN-BARR VIRUS EARLY ANTIGEN-DIFFUSE

Robert I. Fox, La Jolla, and Richard Houghton, Solana Beach, both of Calif., assignors to Scripps Clinic and Research Foundation, La Jolla, Calif.

Filed Dec. 5, 1986, Ser. No. 938,643

Int. Cl.[4] G01N *33/569;* **A61K** *39/12*

U.S. Cl. 435—5 **17 Claims**

7. The method of claim 6 wherein the first immunoreactant is labeled prior to determining according to step (e) by:

(a) admixing a biologically active labeled receptor that binds to human immunoglobulin present in the first immunoreactant to form a labeled second immunoreactant, said labeled receptor being capable of signalling the presence of said labeled receptor in said second immunoreactant; and

(b) maintaining the admixture so formed under biological assay condition for a predetermined period of time sufficient for said labeled receptor to form a second immunoreactant with any anti-EA-D antibodies present as first immunoreactant; and

(c) determining the presence of the labeled immunoreactant.

4,879,214

DIFFERENTIATION OF NUCLEIC ACID SEGMENTS ON THE BASIS OF NUCLEOTIDE DIFFERENCES

John S. Kornher, Claymont, and Kenneth J. Livak, Wilmington, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 15, 1988, Ser. No. 272,068

Int. Cl.[4] C12Q *1/68*

U.S. Cl. 08—10/89 **10 Claims**

1. A process for distinguishing nucleic acid segments on the basis of nucleotide differences, which comprises

synthesizing separately complementary nucleic acid strands on each of at least two target nucleic acid templates using a nucleic acid polymerase and nucleoside triphosphate substrates, wherein at least one of the natural nucleoside triphosphate substrates is completely replaced with a mobility-shifting analog;

and comparing the mobility of the separately synthesized strands in single-stranded form through a size-fractionation medium.

4,879,215

CONCENTRATING IMMUNOCHEMICAL TEST STRIP

Litai Weng, Mountain View; David Calderhead, Menlo Park; Pyare Khanna, San Jose, and Edwin F. Ullman, Atherton, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation of Ser. No. 701,464, Feb. 14, 1985, Pat. No. 4,740,468. This application Mar. 4, 1988, Ser. No. 164,308

The portion of the term of this patent subsequent to Apr. 26, 2005, has been disclaimed.

Int. Cl.[4] G01N *33/53*

U.S. Cl. 435—7 **19 Claims**

1. A method for determining the presence of an analyte in a sample suspected of containing said analyte, which analyte is a member of a specific binding pair ("sbp member") consisting of ligand and its complementary receptor, which method comprises:

(a) contacting, with a test solution containing said sample and a first sbp member capable of binding to said analyte, a contact portion of bibulous material capable of being traversed by said test solution by capillary migration,

said bibulous material containing a second sbp member non-diffusively bound to a small situs on said bibulous material separated from said contact portion, the surface area of said situs being substantially less than that of said bibulous material,

said second sbp member having the characteristic of binding said first sbp member when said first sbp member is bound to said analyte,

with the proviso that, where said second sbp member is able to bind said first sbp member when said first sbp member is not bound to said analyte, an analyte analog capable of binding said first sbp member is non-diffusively bound to said bibulous material at least between said small situs and said contact portion,

(b) allowing the test solution to traverse at least a portion of said bibulous material by means of capillary migration,

(c) detecting the presence of the first sbp member at said situs.

4,879,216

SPECIFIC ANTIBODY AGAINST HEART MUSCLE LIGHT CHAINS, A PROCESS FOR THE PREPARATION THEREOF AND A REAGENT CONTAINING IT

Klaus Hallermayer, Munich; Siegfrid Looser, Weilheim, and Hugo Katus, Bammental, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GMBH, Mannheim, Fed. Rep. of Germany

Filed Mar. 8, 1988, Ser. No. 165,288

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1987, 3707746

Int. Cl.[4] G01N *33/577, 33/569*

U.S. Cl. 435—7 20 Claims

1. Substantially pure antibody which specifically binds to heart muscle myosin light chain and which has a cross reactivity of less than 5% against skeletal muscle myosin light chain.

4,879,217

TEST FOR RHIZOCTONIA BROWN AND YELLOW PATCH

Frank P. Petersen, Beverly; Gary D. Grothaus, Delran, and Sally A. Miller, Pennsauken, all of N.J., assignors to Agri-Diagnostics Associates, Cinnaminson, N.J.

Filed Apr. 28, 1987, Ser. No. 43,307

Int. Cl.[4] G01N *33/569;* C12Q *1/04;* C12P *21/00;* C12N *5/00*

U.S. Cl. 435—7 40 Claims

21. A method for detecting the presence or absence of an antigen of a species of the genus Rhizoctonia in a sample suspected of containing the antigen comprising:

specifically binding any said antigen present in said sample to a monoclonal antibody to Rhizoctonia to form a binary complex,

wherein said monoclonal antibody is conjugated to a detectable label; and

detecting the presence or absence of said label in said binary complex in order to detect the presence or absence of said antigen.

4,879,218

ANTIBODY FOR *C.DIFFICILE*

Tracy D. Wilkins, Blacksburg, and David M. Lyerly, Radford, both of Va., assignors to Virginia Tech Intellectual Properties, Inc.

Continuation of Ser. No. 740,419, Jun. 3, 1985, abandoned, which is a continuation-in-part of Ser. No. 683,150, Dec. 18, 1984, abandoned, which is a continuation-in-part of Ser. No. 417,379, Sep. 13, 1982, Pat. No. 4,533,630. This application Jun. 20, 1988, Ser. No. 211,070

The portion of the term of this patent subsequent to Aug. 6, 2002, has been disclaimed.

Int. Cl.[4] G01N *33/535, 33/577*

U.S. Cl. 435—7 34 Claims

1. Monoclonal antibody for toxin A of *C. difficile* which immunoprecipitates toxin A of *C. difficile.*

4,879,219

IMMUNOASSAY UTILIZING MONOCLONAL HIGH AFFINITY IGM ANTIBODIES

Jack R. Wands, Waban, Mass.; Vincent R. Zurawski, Jr., West Chester, Pa., and Schoemaker, Hubert J. P., Newton, Mass., assignors to General Hospital Corporation, Boston, Mass.

Filed Sep. 19, 1980, Ser. No. 188,735

Int. Cl.[4] G01N *53/00;* A61K *39/395*

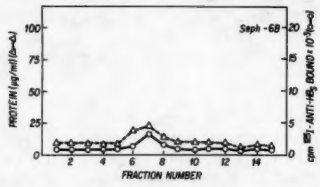
U.S. Cl. 435—7 9 Claims

1. An immunoassay method utilizing an antibody to assay for a substance comprising hepatitis B-surface antigen (HBsAg) determinants which comprises the steps of:

contacting a test sample containing said substance comprising HBsAg determinants with said antibody; and

determining the presence of said substance in said sample;

wherein said antibody is a monoclonal high affinity IgM



antibody having a binding affinity constant for said HBsAg determinants of at least 10^9M^{-1}.

4,879,220

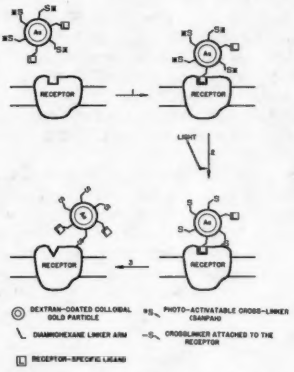
CROSSLINKING RECEPTOR-SPECIFIC PROBES FOR ELECTRON MICROSCOPY

Randall J. Mrsny; G. Bruce Birrell, and Johannes J. Volwerk, all of Eugene, Oreg., assignors to State of Oregon Acting By and Through the State Board of Higher Education On Behalf of the University of Oregon, Eugene, Oreg.

Filed Nov. 18, 1986, Ser. No. 932,437

Int. Cl.[4] G01N *33/53*

U.S. Cl. 435—7 39 Claims



14. A probe for labeling cellular material with a colloidal sized particle, the probe comprising:

a colloidal sized particle;

a ligand capable of joining with a receptor on cellular material; and

a cross linking agent capable of reacting with the cellular material to provide a covalent bond between the probe and the cellular material.

28. The method of claim 27 wherein the ligand and the crosslinking agent are attached to the particle by dextran.

4,879,221

PROCESS FOR DETERMINATION OF γ-GTP ACTIVITY

Kuniaki Tokuda; Seiji Morii, both of Kawagoe, and Kazuhiko Yamanishi, Tokyo, all of Japan, assignors to Wako Pure Chemical Industries, Ltd., Osaka, Japan

Filed Sep. 2, 1986, Ser. No. 902,897

Int. Cl.[4] C12Q *1/48;* G01N *31/00*

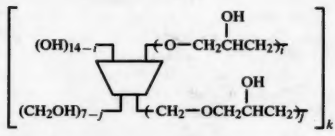
U.S. Cl. 435—15 9 Claims

1. A process for determining γ-glutamyl transpeptidase activity which comprises

adding to a sample a substrate solution comprising γL-glutamyl-p-nitroanilide and a modified cyclodextrin of the formula:

$$\beta\text{-CD}(-OH)_{21-x}[-OC_nH_{2n-(m-1)}(-OH)_m]_x \quad (I)$$

wherein CD is a cyclodextrin residue; m is an integer of 1 to 10; n is an integer of 1 to 5, provided that $2n-(m-1)\geq 0$; and x is 3 to 21, or a modified cyclodextrin of the formula:



(II)

wherein i is zero to 3; j is 1 to 5; and k is 2 to 5, and adding to the sample an acceptor solution containing an acceptor for glutamic acid, in this order or a reverse order, and

quantitatively measuring p-nitroaniline generated from γ-L-glutamyl-p-nitroanilide by γ-glutamyl transpeptidase activity, wherein the amount of p-nitroaniline is an indication of the activity of gamma-glutamyl-transpeptidase activity.

4,879,222

METHOD OF ISOLATING TUMOR-SECRETED PRODUCTS USING A NOVEL PROTEIN-FREE MEDIUM

Edward M. Alderman, Dedham; James W. Fett, Waltham, and Bert L. Vallee, Brookline, all of Mass., assignors to President and Fellows of Harvard College, Cambridge, Mass.

Filed Aug. 28, 1986, Ser. No. 901,101

Int. Cl.[4] C12P *21/00*; C12N *05/00*

U.S. Cl. 435—68 **3 Claims**

1. A method of isolating a mammalian tumor-secreted product comprising maintaining mammalian anchorage-dependent colonic adenocarcinoma cells in a maintenance medium containing about 5 mM to about 12 mM of L-glutamine and devoid of exogenous protein for more than ten days and isolating said tumor-secreted product from the medium.

4,879,223

METHOD FOR PRODUCING PROTEIN CONTAINING NONPROTEIN AMINO ACIDS

Tatsuo Miyazawa; Shigeyuki Yokoyama, both of Bunkyo, and Tetsuo Miyake, Koda, all of Japan, assignors to Wakunaga Seiyaku Kabushiki Kaisha, Osaka, Japan

Filed Apr. 25, 1988, Ser. No. 186,075

Claims priority, application Japan, Apr. 24, 1987, 62-101581

Int. Cl.[4] C12P *21/00*

U.S. Cl. 435—68 **9 Claims**

1. In a method wherein an organism capable of producing a protein is provided with a nutrient source containing a nonprotein amino acid whereby a protein comprising the nonprotein amino acid copolymerized therein is produced, the improvement which comprises subjecting the organism to conditions such that growth of the organism or the protein synthesis associated with the growth is suppressed, the suppression being such that it takes place even when the nutrient source is free from the nonprotein amino acid.

4,879,224

DNA SEQUENCES, RECOMBINANT DNA MOLECULES AND PROCESSES FOR PRODUCING HUMAN PHOSPHOLIPASE INHIBITOR POLYPEPTIDES

Barbara P. Wallner, Cambridge; R. Blake Pepinsky, Watertown, and Jeffrey L. Garwin, Bedford, all of Mass., assignors to Biogen, Inc., Cambridge, Mass.

Filed Jan. 10, 1985, Ser. No. 690,146

Int. Cl.[4] C12N *1/14, 1/16, 5/00, 7/00, 15/00, 1/20*; C07H *21/00*; C12P *21/00*

U.S. Cl. 435—68 **9 Claims**

1. A recombinant DNA molecule comprising a DNA sequence coding for a phospholipase inhibitor polypeptide and being selected from the group consisting of:

(a) the cDNA insert of ALC,

(b) DNA sequences which hybridize to the cDNA insert of ALC and which code on expression for a phospholopase inhibitor, and

(c) DNA sequences which are degenerate as a result of the genetic code to either of the foregoing DNA sequences and which code on expression for a phospholipase inhibitor.

4,879,225

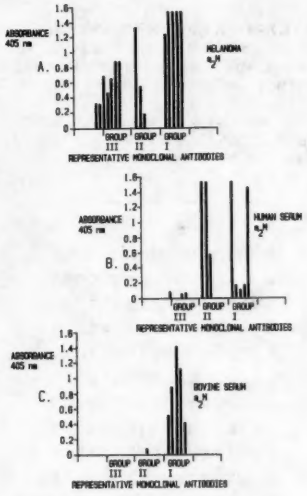
ENHANCED PRODUCTION OF ANTIBODIES UTILIZING INSOLUBILIZED IMMUNE COMPLEXES

Alton C. Morgan, Jr., Edmonds; Clive S. Woodhouse, and Robert F. McIntyre, both of Seattle, all of Wash., assignors to NeoRx Corporation, Seattle, Wash.

Continuation-in-part of Ser. No. 876,828, Jun. 20, 1986. This application Mar. 11, 1987, Ser. No. 24,632

Int. Cl.[4] C12P *21/00*; C12N *5/00, 15/00*; A61K *39/00*

U.S. Cl. 435—68 **58 Claims**



1. A method for enhancing production of antibodies, comprising the steps of:

absorbing antibody onto insolubilized protein A, thereby forming an immunosorbent;

combining an antigen with said immunosorbent, forming an insolubilized immune complex;

immunizing an animal with said insolubilized immune complex.

4,879,226

NOVEL HUMAN PHYSIOLOGICALLY ACTIVE POLYPEPTIDE

Robert B. Wallace, West Covina, Calif., and Hirataka Itoh, Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 6, 1984, Ser. No. 597,372

Int. Cl.[4] C12P *21/00*; C12N *15/00, 1/20*; C07H *15/12*

U.S. Cl. 435—68 **40 Claims**

1. An isolated physiologically active human tumor necrosis factor polypeptide comprising an amino acid sequence represented by the following formula:

Ser Ser Ser Arg Thr Pro Ser Asp Lys Pro Val Ala His Val Val Ala Asn Pro Gln Ala Glu Gly Gln Leu Gln Trp Leu Asn Arg Arg Ala Asn Ala Leu Leu Ala Asn Gly Val Glu Leu Arg Asp Asn Gln Leu Val Val Pro Ser Glu Gly Leu Tyr Leu Ile Tyr Ser Gln Val Leu Phe Lys Gly Gln Gly Cys Pro Ser Thr His Val Leu Leu Thr His Thr Ile Ser Arg Ile Ala Val Ser Tyr Gln Thr Lys Val Asn Leu Leu Ser Ala Ile Lys Ser Pro Cys Gln Arg Glu Thr Pro Glu Gly Ala Glu Ala Lys Pro Trp Tyr Glu Pro Ile Tyr Leu Gly Gly Val Phe Gln Leu Glu Lys Gly Asp Arg Leu Ser Ala Glu Ile Asn Arg Pro Asp Tyr Leu Asp Phe Ala Glu Ser Gly Gln Val Tyr Phe Gly Ile Ile Ala Leu

wherein Gln stands for a glutamine residue, Asp an aspartic acid residue, Pro a proline residue, Tyr a tyrosine residue, Val a valine residue, Lys a lysine residue, Glu a glutamic acid residue, Ala an alanine residue, Asn an asparagine residue, Leu a leucine residue, Phe a phenylalanine residue, Gly a glycine residue, His a histidine residue, Ser a serine residue, Thr a threonine residue, Ile an isoleucine residue, Trp a tryptophan residue, Arg an arginine residue, and Cys a cysteine residue, or a variant of said polypeptide having all of the activity of human tumor necrosis factor.

4,879,227

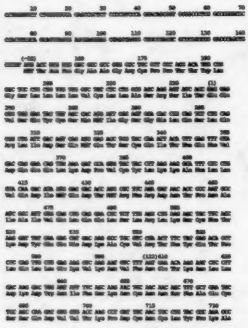
PRODUCTION OF A RECOMBINANT HUMAN COLONY STIMULATING FACTOR

Steven C. Clark, Winchester, and Gordon G. Wong, Cambridge, both of Mass., assignors to Genetics Institute, Inc., Cambridge, Mass.

Filed May 6, 1986, Ser. No. 860,377

Int. Cl.[4] C12P *21/02;* **C12N** *15/00;* **C07H** *15/12*

U.S. Cl. 435—70 **5 Claims**



1. A process for producing a protein capable of stimulating proliferation of monocytic cells in both human and mouse bone marrow assays comprising culturing host cells containing a DNA vector which contains a DNA sequence encoding the polypeptide sequence encompassing the mature form of the protein of FIG. 2, the DNA sequence being in operative association with an expression control sequence and recovering the protein so produced from the cultured host cells.

4,879,228

MICROBIAL PRODUCTION OF POLYFRUCTOSE

Thomas D. Mays, and Ellen L. Dally, both of Columbia, Md., assignors to IGI Biotechnology, Inc., Columbia, Md.

Filed Jan. 4, 1985, Ser. No. 689,238

Int. Cl.[4] C12P *19/04;* **C12N** *1/20;* **C12R** *1/01*

U.S. Cl. 435—101 **1 Claim**

1. In a process for the production of a water-soluble levan by anaerobically fermenting a nutrient growth medium feedstock having a carbon source consisting esesntially of a source of an assimilable sugar selected from the group consisting of sucrose, raffinose, and mixtures thereof with a microorganism capable of converting the sugar to levan and ethanol under nutient growth conditions, the improvement wherein the microorganism is a member of the genus Zymomonas which has the levan-producing characteristics of *Zymomonas mobilis* ATCC Deposit No. 39,985, the growth medium has initial sugar concentration of at least about 10% by weight and an initial concentration of an assimilable source of nitrogen no more than about half of that which would be optimal for the production of ethanol and wherein the fermentation is conducted at a temperature at least about 5° C. below the optimum temperature for the production of ethanol, thereby increasing the amount of available fructose converted to levan.

4,879,229

METHOD FOR PREPARING 2,5-DIKETO-D-GLUCONIC ACID

Takayasu Sonoyama; Shigeo Yagi; Bunji Kageyama, all of Osaka, and Masahiro Tanimoto, Hyogo, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Continuation of Ser. No. 925,538, Oct. 28, 1986, abandoned, which is a continuation of Ser. No. 288,332, Jul. 30, 1981, abandoned. This application Sep. 12, 1988, Ser. No. 243,215

Claims priority, application Japan, Aug. 14, 1980, 55-112406

The portion of the term of this patent subsequent to Sep. 24, 2002, has been disclaimed.

Int. Cl.[4] C12P *7/60, 7/58*

U.S. Cl. 435—138 **23 Claims**

1. A substantially biologically pure culture consisting essentially of a microorganism of the genus Erwinia which is capable of producing a recoverable quantity of 2,5-diketo-D-gluconic acid or a salt thereof upon cultivation in the presence of D-glucose and which is selected from the group consisting of *Erwinia citreus* ATCC 31623, *Erwinia punctata* ATCC 31624, *Erwinia punctata* ATCC 31625, *Erwinia punctata* ATCC 31626, *Erwinia punctata* ATCC 31627, *Erwinia terreus* ATCC 31628, *Erwinia terreus* ATCC 31629, *Erwinia terreus* ATCC 31630, and *Erwinia terreus* ATCC 31631.

4,879,230

ESCHERICHIA COLI CANDIDA MALTOSA SACCHAROMYCES CEREVISIAE SHUTTLE VECTORS AND METHOD FOR MAKING

Masamichi Takagi, Fuchu; Keiji Yano, Tokyo; Ichiro Shibuya, and Minoru Morikawa, both of Kashiwa, all of Japan, assignors to Nikka Whisky Distilling Co., Ltd., Tokyo, Japan

Filed Dec. 24, 1985, Ser. No. 813,193

Claims priority, application Japan, Sep. 27, 1985, 60-212187; Sep. 27, 1985, 60-212188

Int. Cl.[4] C12N *15/00, 5/00;* **C12P** *19/34*

U.S. Cl. 435—172.3 **4 Claims**

1. A process for producing a plasmid comprising:

(a) preparing a gene library of *C. maltosa* by partially digesting total *C. maltosa* DNA with Sau3AI and ligating the fragments into the BamHI restriction site of YEp13;

(b) transforming *E. coli* cells with the plasmids prepared in step (a), isolating ampicillin resistant, tetracycline sensitive colonies therefrom, and recovering plasmid DNA from the isolated colonies;

(c) transforming a leucine-dependent strain of *C. maltosa* with the plasmids recovered in step (b), growing said transformed cells in a leucine-free medium and isolating plasmid DNA from the surviving colonies;

(d) transforming *E. coli* with the plasmid isolated in step (c), isolating ampicillin resistant colonies, and recovering the plasmid DNA therefrom;

(e) digesting the plasmid recovered in step (d) with BamHI, and isolating the 3.4 Kb TRA region;

(f) digesting plasmid YEp13 with Bgl II to isolate the Leu 2 gene and annealing the Leu 2 gene into the EcoRI site of pBR322; and

(g) digesting the plasmid formed in step (f) with XhoI and

annealing the DNA fragment obtained in step (e) into the XhoI restriction site.

4,879,231

TRANSFORMATION OF YEASTS OF THE GENUS PICHIA

David W. Stroman, Bartlesville, Okla.; James M. Cregg; Michael M. Harpold, both of San Diego, Calif., and George T. Sperl, Gurnee, Ill., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 30, 1984, Ser. No. 666,579

The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.

Int. Cl.[4] C12N *15/00, 5/00, 7/00*

U.S. Cl. 435—172.3 **18 Claims**

1. A process for transforming a host yeast strain of *Pichia pastoris*, which is defective in at least one biosynthetic pathway, said process comprising:

(a) contacting the host yeast strain with a sulfhydryl group reducing agent;

(b) contacting the product cells of step (a) with a cell wall degrading reagent under conditions suitable for the formation and maintenance of spheroplasts;

(c) contacting the spheroplasts generated in step (b) with a hybrid plasmid which is capable of functioning as a selectable marker to complement said defect under conditions suitable for transformation; and

(d) treating the product of step (c) under cell wall regenerating conditions wherein said conditions suitable for the formation of spheroplasts comprise:

(i) 10–100 μg of cell wall degrading reagent per 10 mL of cell suspension; wherein said cell suspension is prepared by suspending exponentially growing cells in SCE buffer;

(ii) maintained at 25–35° C.;

(iii) for 15–60 minutes;

and wherein said contacting conditions suitable for transformation comprise:

(i) 2–10 volumes of $CaCl_2$-polyethylene glycol solution per volume of spheroplast-containing suspension;

(ii) maintained at 20–30° C.;

(iii) for 5–30 minutes

and where said cell wall regenerating conditions comprise:

(i) adding transformed spheroplasts to regeneration agar, wherein said regeneration agar comprises:

about 1 M sorbitol,

about 0.1 M dextrose,

about 7 g/L yeast nitrogen base, and

about 3% agar;

(ii) maintained at 25–35° C.;

(iii) for about 3–10 days.

4,879,232

MULTILAYERED STRUCTURE CONTAINING IMMOBILIZED BLUD-GREEN ALGAE

J. Gavin MacDonald, Decatur, and Ronald S. Nohr, Roswell, both of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Mar. 17, 1987, Ser. No. 26,597

Int. Cl.[4] C12N *11/12, 11/08, 1/12;* **C05F** *11/08*

U.S. Cl. 435—179 **21 Claims**

1. A nutrient-producing, multilayered structure having a thickness which is substantially less than either its breadth or width, which structure comprises:

A. a first layer which comprises a composite consisting essentially of a substantially water-insoluble support having a surface energy of from about 30 dynes per cm to about 115 dynes per cm to which nitrogen-fixing filamentous blue-green algal heterocyst cells are attached, said support being either particulate or fibrous and substantially free of substances which have a significant deleterious effect on the viability of the immobilized algae, which attached algal heterocyst cells, when allowed to grow in a nitrogen deficient environment, fix nitrogen at a rate which is substantially greater than that of such cells not so attached;

B. a second layer adjacent to and contiguous with at least a portion of a first surface of said first layer and attached to said first layer in such a manner as to substantially maintain said second layer adjacent to and contiguous with said first surface; and

C. a third layer adjacent to and contiguous with at least a portion of a second surface of said first layer and attached to said first layer in such a manner as to substantially maintain said third layer adjacent to and contiguous with said second surface; wherein partially transparent to actinic radiation.

4,879,233

NOVEL *ASPERGILLUS NIVEUS* MICROORGANISM USED FOR THE CHIRAL REDUCTION OF CARBONYL GROUPS

William Charney, Montclair, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Filed Feb. 10, 1989, Ser. No. 309,461

Int. Cl.[4] C12N *1/16;* **C12R** *1/66;* **C12P** *7/02*

U.S. Cl. 435—254 **1 Claim**

1. A biologically pure culture of the fungus *Aspergillus niveus*, ATCC 20922, said culture being capable of chiral reduction of ketones.

4,879,234

PROCESS FOR THE PURIFICATION AND RECOVERY OF FORMATE-DEHYDROGENASE (FDH) FROM *CANDIDA BOIDINII*, AND FDH-CONTAINING PRODUCT

Arno Cordes, Salzgitter; Maria-Regina Kula, Niederzier-Hambach; Karl-Heinz Kroner, Wolfenbüttel, and Wolfgang Stach, Salzgitter, all of Fed. Rep. of Germany, assignors to Gesellschaft fur Biotechnologische Forschung mbH (GBF), Braunschweig, Fed. Rep. of Germany

Filed Jul. 30, 1986, Ser. No. 891,868

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1985, 3527268

Int. Cl.[4] C12N *9/02;* **C12R** *1/72*

U.S. Cl. 435—189 **14 Claims**

1. Process for the purification and recovery of formate-dehydrogenase enzyme from *Candida boidinii* cells, which comprises:

(a) disintegrating the enzyme-containing cells to obtain a mixture of cell material and the enzyme; and

(b) affinity extracting the enzyme from the mixture with an aqueous 2-phase extracting agent, one phase of which contains a triazine dyestuff bonded to an inert, water-soluble polymer.

4,879,235

PROCESS FOR PRODUCING PROTEASE BY CULTIVATING A PROTEASE-PRODUCING MOLD IN A LIQUID MEDIUM

Hiroshi Motai; Yaichi Fukushima, both of Noda; Tetsuro Fukase, and Harumichi Itoh, both of Atsugi, all of Japan, assignors to The Japanese Research and Development Association for Bioreactor System, Tokyo, Japan

Filed Nov. 21, 1986, Ser. No. 933,177

Claims priority, application Japan, Nov. 29, 1985, 60-267326; Dec. 27, 1985, 60-292988

Int. Cl.[4] C12N *9/62, 9/50, 9/60, 1/16*

U.S. Cl. 435—225 **5 Claims**

1. In a process for producing protease by cultivating a protease-producing mold belonging to the genus Aspergillus in a liquid culture medium, wherein the improvement comprises continuously adding, in response to a measurement of total extracellular nitrogen, a liquid medium containing a protein

material to the liquid culture medium after substantial termination of proliferation of the mold cells, in a manner which maintains the nitrogen concentration in the extracellular liquid culture medium at 0.05% (W/V) or below.

4,879,236

METHOD FOR PRODUCING A RECOMBINANT BACULOVIRUS EXPRESSION VECTOR

Gale E. Smith, and Max D. Summers, both of Bryan, Tex., assignors to The Texas A&M University System, College Station, Tex.

Continuation of Ser. No. 609,697, May 16, 1984, abandoned, which is a continuation-in-part of Ser. No. 498,858, May 27, 1983, Pat. No. 4,745,051. This application Apr. 16, 1987, Ser. No. 40,367

The portion of the term of this patent subsequent to May 17, 2005, has been disclaimed.

Int. Cl.[4] C12N *7/00, 21/00, 15/00*

U.S. Cl. 435—235 **11 Claims**

1. A recombinant baculovirus expression vect-r, capable of expressing a selected heterologous gene in a host insect cell, wherein said expression vector is a baculovirus genome comprising at least one selected heterologous gene inserted into the polyhedrin gene at a position ranging from the polyhedrin transcriptional start signal to the ATG start site and under the transcriptional control of a baculovirus polyhedrin promoter.

4,879,237

USE OF PEPTIDES IN CONTROL OF CELL ATTACHMENT AND DETACHMENT

Eric I. Rudslahti, Rancho Santa Fe; Edward G. Hayman, Oceanside, and Michael D. Pierschbacher, San Diego, all of Calif., assignors to La Jolla Cancer Research Foundation, La Jolla, Calif.

Filed May 24, 1985, Ser. No. 738,078

Int. Cl.[4] C12N *5/00*

U.S. Cl. 435—240.2 **9 Claims**

1. A method of controlling the Arg-Gly-Asp mediated attachment of animal cells to substrates comprising the steps of:

(a) contacting a substrate normally capable of accepting cells with cells normally capable of attaching to such substrate; and

(b) contacting the substrate with a solution containing a polypeptide consisting essentially of the sequence GLY-ARG-GLY-ASP-ALA-PRO.

4,879,238

DEODORANT AND METHOD FOR PREPARING AND STORING SAME

Kosei Hata, Osaka, Japan, assignor to Seikenkai, Japan

Continuation of Ser. No. 260,487, May 4, 1981, abandoned, which is a continuation of Ser. No. 799,319, May 23, 1977, abandoned. This application Apr. 30, 1984, Ser. No. 604,417

Int. Cl.[4] C12N *1/38, 1/36, 1/20*

U.S. Cl. 435—244 **29 Claims**

1. A method for culturing a living, autotrophic bacteria for the deodorization of excrement which comprises culturing said bacteria in a medium comprising said excrement containing one or more S-, N- and C-containing compounds which are present as foul-smelling substances in said excrement and/or an amino acid selected from the group consisting of cystine, cysteine, methionine, glycine, glutamic acid, alanine, aminobutyric acid, lysine, trysosine and histidine, said culturing being conducted for a time and under conditions to effect multiplication of the autotrophic bacteria sufficient to provide deodorization of said excrement, wherein said one or more S-, N- and C-containing compounds and/or amino acids are present in an amount sufficient to accelerate the rate of growth of the bacteria when they enter logarithmic phase relative to the rate of growth in the absence of said S-, N- and C-containing compounds and/or amino acids.

4,879,239

METHOD OF CULTURING FREEZE-DRIED MICROORGANISMS AND RESULTANT PREPARATION

Pierre-Marc Daggett, Rockville, and Frank P. Simione, Olney, both of Md., assignors to American Type Culture Collection, Rockville, Md.

Continuation-in-part of Ser. No. 548,418, Nov. 3, 1983, Pat. No. 4,672,037. This application Sep. 9, 1986, Ser. No. 905,175

The portion of the term of this patent subsequent to Jun. 9, 2004, has been disclaimed.

Int. Cl.[4] C12N *1/20, 1/16, 1/04;* **C12Q** *1/06*

U.S. Cl. 435—252.1 **6 Claims**

1. A freeze-dried preparation of microorganisms comprising a population of viable microorganisms which survive freeze-drying and nutrient medium in a sealed vessel, said nutrient medium added prior to freeze-drying, wherein the population of viable microorganisms which survive freeze-drying is determined prior to freeze-drying to ensure that the population of viable microorganisms which survive freeze-drying relative to the concentration and volume of nutrients in said nutrient medium is sufficient to support substantial logarithmic growth of the population of viable microorganisms in said preparation upon rehydration with a fixed volume of water, wherein said fixed volume of water is sufficient to initiate substantial logarithmic growth of said population of viable microorganisms in said preparation and a sufficient amount of colloidal component to form said freeze-dried preparation of microorganisms into a plug.

4,879,240

MICROBIAL CONTROL OF HYDROGEN SULFIDE PRODUCTION BY SULFATE REDUCING BACTERIA

Kerry L. Sublette, Tulsa, Okla.; Maron E. Woolsey, Tulsa, Okla.; Francis S. Manning, Tulsa, Okla.; Anne D. Montgomery, San Antonio, Tex., and Michael J. McInerney, Norman, Okla., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Jul. 19, 1988, Ser. No. 221,152

Int. Cl.[4] C12N *1/20*

U.S. Cl. 435—252.1 **10 Claims**

1. A method of controlling the biogenic production of sulfide in an environment containing sulfate and sulfate-reducing bacteria and sulfide produced by the conversion of said sulfate by said sulfate-reducing bacteria wherein said sulfate-reducing bacteria would otherwise continue to convert said sulfate to sulfide comprising the step of introducing into said environment a strain of *Thiobacillus dentrificans* which is resistant to sulfide concentrations in excess of 200 μm.

4,879,241

TYLOSIN RESISTANCE-CONFERRING GENE, DESIGNATED TLRB, FOR USE IN STREPTOMYCES AND OTHER ORGANISMS

Virginia A. Birmingham, Carmel, and Eugene T. Seno, Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Jun. 5, 1986, Ser. No. 871,051

Int. Cl.[4] C12N *1/20, 15/00, 1/00;* **C12P** *21/00, 11/34;* **C12R** *1/465;* **C07H** *15/12*

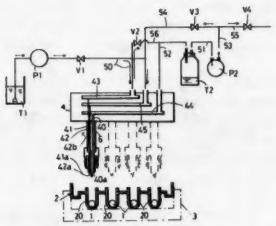
U.S. Cl. 435—253.5 **22 Claims**

1. The insulated tlrB gene of *Streptomyces fradiae.*

4,879,242
METHOD OF SYRINGING REACTION BEAD IN EXAMINATION OF BLOOD OR THE LIKE AND APPARATUS THEREOF

Yasunobu Tsukioka, 1389-33, Tsurugasone, Yashio-shi, Saitama-ken, Japan

Filed Jan. 16, 1987, Ser. No. 4,146
Claims priority, application Japan, Nov. 18, 1986, 61-274968
Int. Cl.[4] G01N *35/00*
U.S. Cl. 436—54 **7 Claims**



1. An apparatus for exposing reaction beads to a fluid, comprising:

bead containing means for holding a reaction bead, comprising a flask;

support means for supporting said flask;

a liquid supply nozzle for supplying liquid to a reaction bead in said flask supported by said holding means, said liquid supply nozzle having one free end portion and one terminal end portion;

a suction nozzle, distinct from said liquid supply nozzle, for suctioning liquid out from said flask, said suction nozzle having one terminal end portion and one free end portion;

an air jet nozzle for blowing air into said flask simultaneously with the suctioning of liquid out from said flask by said suction nozzle, said air jet nozzle having one free end portion and one terminal end portion;

means for simultaneously positioning said free end portions of said suction nozzle and said air jet nozzle within said flask so that said free end of said air jet nozzle is positioned on one side of said flask and said free end of said suction nozzle is positioned on an opposite side of said flask; and

means for blowing air into said flask through said air jet nozzle simultaneously with said suctioning of liquid out from said flask by said suction nozzle.

4,879,243
USE OF SUBSTITUTED ORTHO-QUINONES AS ELECTRON TRANSFER AGENTS IN ANALYTICAL DETERMINATIONS

Albert J. Mura, and Robert W. Zercie, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 26, 1987, Ser. No. 53,916
The portion of the term of this patent subsequent to May 24, 2005, has been disclaimed.
Int. Cl.[4] G01N *33/48*
U.S. Cl. 436—63 **7 Claims**

1. A method for the determination of an analyte in a liquid comprising the steps of:

A. at a pH of 9 or less contacting a sample of the liquid with a composition comprising

(a) an electron transfer agent (ETA) which is a stable, ethanol soluble 1,2-benzoquinone with methoxy groups or a fused 1,4-dioxane ring in positions 4 and 5 or with a substituted or unsubstituted lower alkoxy group at position 4 and a fused five- or six-membered carbocyclic or hetercyclic ring at positions 5 and 6, said substituents being present such that the reduction potential, $E_{\frac{1}{4}}$, of said ETA falls within the range of about −320 to 400 mV,

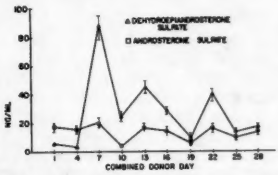
(b) a reducible composition which provides a detectable species when reduced by the ETA, and

B. detecting said detectable species.

4,879,244
BIRTH CONTROL METHOD INVOLVING MONITORING OF AXILLARY ANDROSTENOL AND DEHYDROEPIANDROSTERONE

Winnifred B. Cutler, Haverford; George Preti, Horsham, both of Pa., and George R. Huggins, Parkton, Md., assignors to Monell Chemical Senses Center and University of Pennsylvania, both of Philadelphia, Pa.

Division of Ser. No. 695,053, Jan. 25, 1985, Pat. No. 4,670,401. This application Jan. 20, 1987, Ser. No. 5,240
Int. Cl.[4] G01N *33/487*
U.S. Cl. 436—65 **11 Claims**



1. A birth control method comprising the steps of:

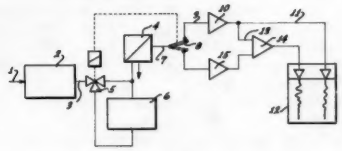
(a) determining the onset of the fertile period of a human female by monitoring the variation in concentration in the axillary secretions of said female of a compound selected from the group consisting of androstenol and a dehydroepiandrosterone, by beginning said monitoring at the cessation of menses until a first significant increase in a concentration of at least one of said compounds indicates the onset of the fertile period; and

(b) causing said human female to avoid exposure to fertilization beginning from about that time until at least about 1 day following the expected time of ovulation.

4,879,245
MEASURING THE CONCENTRATION OF TWO COMPONENTS IN A GAS BLEND

Alois Ruse, Oberursel, Fed. Rep. of Germany, assignor to Hartmann & Braun AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Aug. 5, 1985, Ser. No. 762,714
Claims priority, application Fed. Rep. of Germany, Aug. 4, 1984, 3428814; Sep. 4, 1984, 3432444
Int. Cl.[4] G01N *33/00*
U.S. Cl. 436—124 **3 Claims**



1. Method for ascertaining the concentration of two components in a gaseous blend, wherein the gases are amenable for reacting with each other, comprising the steps of:

using a single analyzer and a reaction chamber in an input path for the analyzer and bypassing that reaction chamber for alternatingly ascertaining a depleted and an unde-

pleted concentration of the component with the larger concentration;

measuring the concentration of that one of the two components expected to have a larger concentration, by means of said single analyzer, including as substeps bypassing the reaction chamber and storing temporarily a measured value as measured by the analyzer when bypassing the reaction chamber, and indicating a representation of that measured value;

causing the two components to react to form a new compound such that one of the two components having a smaller concentration, is completely used up by the reaction to obtain said depleted concentration;

measuring a residual concentration of the first, mentioned larger concentration component following the reaction in the reaction chamber to thereby ascertain that portion of that larger concentration component not used up by the reaction, and storing separately a resulting measuring value; and

forming the difference between the two measured values as indication and representation of the component with the smaller concentration.

4,879,246

METHOD AND DEVICE FOR MINERALIZATION OF CARBONACEOUS MATERIAL

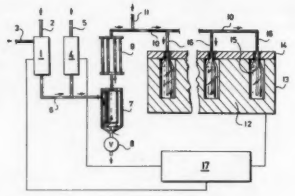
Petr Püschel; Zdenek Formánek, both of Most; Václav Krivanek, Louny-Dobromerice; Antonín Pokorny, Most; Anna Vlasáková, Most, and Alena Stuchíková, Most, all of Czechoslovakia, assignors to Tessek sdruzeni Praha, Prague, Czechoslovakia

Filed Nov. 3, 1987, Ser. No. 116,435

Claims priority, application Czechoslovakia, Nov. 3, 1986, 7950-86; Jun. 18, 1987, 4502-87

Int. Cl.[4] G01N *25/22, 31/12*

U.S. Cl. 436—145 **11 Claims**



1. Method for the mineralization of a carbonaceous material specimen comprising the steps of

heating the specimen to a temperature ranging from 300 to 400 degrees C. for 6 to 20 hours at atmospheric pressure in a stream of oxygen at a rate of 0.03 to 0.15 ml per second per gram of specimen,

adding to the stream of oxygen, in an amount of 1 to 6 volume percent, a gas possessing a higher oxidation strength than that of oxygen, said gas being selected from the group consisting of ozone, nitrogen, oxides, chlorine and mixtures thereof.

2. An apparatus for the mineralization of a carbonaceous material specimen comprising

a heatable block having a flat bottom, and

mineralization flasks having necks;

said heatable block being provided with cylindrical holes for inserting the mineralization flasks containing the specimens;

a lid provided with openings for the necks of the mineralization flasks; said mineralization flasks having a cylindrical shape that conically tapers towards the neck;

a plurality of capillaries loosely inserted into the necks of said flasks; and

a distributor of a mineralization of gas mixture, said capillaries being connected to said distributor for feeding said gas mixture into said flasks.

4,879,247

METHOD AND APPARATUS FOR ISOCRATIC AFFINITY CHROMATOGRAPHY

Sten Ohlson, Lund, Sweden, assignor to Perstorp Biolytica, Sweden

Filed Feb. 26, 1988, Ser. No. 160,579

Claims priority, application Sweden, Mar. 6, 1987, 8700949

Int. Cl.[4] G01N *33/53;* **B01D** *15/08*

U.S. Cl. 436—527 **14 Claims**

1. A method for separating a substance from a heterogeneous solution by isocratic affinity chromatography comprising the steps of:

providing a stationary phase comprising microparticulate carriers having ligands bound thereto, said ligands being capable of weakly interacting with said substance wherein the thermodynamic dissociation constant for the interaction between said substance and ligand is greater than about 10^{-3};

contacting said heterogeneous solution with said stationary phase under isocratic conditions where said substance weakly interacts with said ligand to provide separation of said substance from said heterogeneous solution under isocratic conditions.

4,879,248

ASSAY FOR TRICHOTHECENES

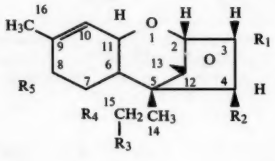
Fun S. Chu; Ru-Dong Wei, and Guang S. Zhang, all of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Apr. 28, 1987, Ser. No. 43,648

Int. Cl.[4] G01N *33/531, 33/543, 33/537;* **B63H** *1/08*

U.S. Cl. 436—543 **7 Claims**

1. An assay for the presence in a sample of a trichothecene having at least three hydroxyl groups at the R_1–R_5 positions, the trichothecene having the formula:



the assay comprising the steps of:

converting a hydroxyl group of the trichothecene to an organic moiety linked to the remainder of the trichothecene by oxygen, so as to form a variant with no more than two hydroxyl groups at the R_1–R_5 positions; and

adding an antibody capable of binding to the variant j and determining the presence of said trichothecene in said sample as a measure of said antibody binding to said variant.

4,879,249
LINKER COMPOUNDS, LINKER-COMPOUND-LIGANDS AND LINKER-COMPOUND-RECEPTORS

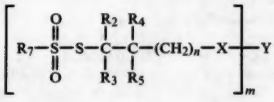
Thomas O. Baldwin, 801 Delma Dr.; Thomas F. Holzman, 807 D Nauidad, both of Bryan, Tex. 77801; Paul S. Satoh, 1424 Surrey, Portage, Mich. 49081, and Frederick S. Yein, 907 Boswell La., Kalamazoo, Mich. 49007

Division of Ser. No. 469,852, Feb. 25, 1983, Pat. No. 4,614,712. This application Mar. 17, 1986, Ser. No. 840,187

Int. Cl.[4] G01N *33/532*; **C07D** *213/62, 209/48*

U.S. Cl. 436—543 **2 Claims**

2. A linker-compound-ligand or a linker-compound-receptor of the formula



wherein

R_7 is a lower alkyl group having from 1 to 6 carbon atoms; phenyl; phenyl substituted with fluoro, nitro or a lower alkyl group having from 1 to 4 carbon atoms; 2-pyridyl; or 4-pyridyl; n is zero to 15;

R_2 and R_3 are the same and are hydrogen, methyl or ethyl;

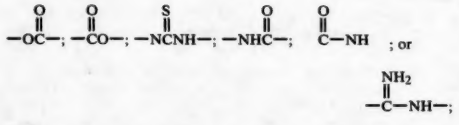
R_4 and R_5 are the same and are hydrogen, methyl or ethyl; or R_2, R_3.

R_4 and R_5 taken together with the carbon atoms to which they are attached represent a cycloalkyl group having from 4 to 6 carbon atoms, or represent 1,4-phenylene with the proviso that when R_7 is a lower alkyl group having one carbon atom or phenyl substituted with a lower alkyl group having one carbon atom and n is zero and each of R_2, R_3, R_4 and R_5 is hydrogen,

m is an integer equivalent to the number of reactive functions present on the ligand or receptor capable of reacting with the linker compound;

X represents the functional linkage between the linker compound and the ligand or receptor and is

—NR— wherein R is hydrogen or any group which may be present on the ligand or receptor functional secondary amine;



Y represents the ligand or receptor to be labeled or assayed absent the functional group which reacted with the linker compound.

4,879,250
METHOD OF MAKING A MONOLITHIC INTERLEAVED LED/PIN PHOTODETECTOR ARRAY

Eric Y. Chan, Mercer Island, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Sep. 29, 1988, Ser. No. 251,134

Int. Cl.[4] H01L *31/18, 21/20*

U.S. Cl. 437—3 **9 Claims**

1. A process for fabricating an integrated optical device, comprising the steps of:

in a single epitaxial growth operation and in succession on a substrate, growing an intrinsic layer, a first confining layer, an active light emitting layer, a second confining layer, and a cap layer;

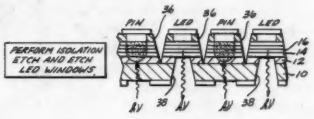
depositing an insulating layer on said cap layer;

opening a plurality of first holes through said insulating layer to said cap layer;

diffusing a conductivity effecting material through said first holes into said intrinsic layer;

opening a plurality of second holes through said insulating layer to said cap layer;

forming first and second metal p-contacts on said insulating layer, one of said first metal p-contacts being formed through each of said first holes, one of said second metal



p-contacts being formed through each of said second holes;

forming metal n-contacts on a side of said substrate that lies opposite said insulating layer, said metal n-contacts being arranged to leave portions of said substrate exposed, one of said exposed portions lying opposite each of said first and second metal p-contacts;

etching an isolation groove between each of said first and second metal p-contacts, said grooves extending into said intrinsic layer; and

etching windows through said substrate and said intrinsic layer to said first confining layer, one of said windows being etched opposite each of said second metal p-contacts.

4,879,251
METHOD OF MAKING SERIES-CONNECTED, THIN-FILM SOLAR MODULE FORMED OF CRYSTALLINE SILICON

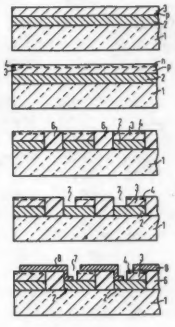
Wolfgang Kruehler, Unterhaching, and Peter Milla, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 21, 1988, Ser. No. 222,505

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1987, 3727826

Int. Cl.[4] H01L *31/18, 27/14*

U.S. Cl. 437—4 **11 Claims**



1. A method for manufacturing a series-connected, thin-film solar cell module of crystalline silicon comprising the steps of:

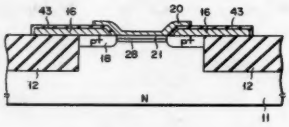
(a) applying an electrically conductive layer (2) over the surface of a large-area substrate (1) of glass or ceramic;
(b) applying a polycrystalline, p-doped silicon layer (3) to the surface of said conductive layer (2) which has a grain size of 200 through 500 micrometers;
(c) forming a pn-junction (4) in said silicon layer (3) by introducing n-dopant atoms or, respectively, ions;
(d) forming trenchs in said electrically conductive layer (2) and said silicon layer (3) to produce strips where the trenches extend down onto the surface of the substrate (1) with a spacing of about 1 to 2 cm;
(e) filling said trenches with an electrically insulating material (6);
(f) forming holes (7) for the series-interconnection of the individual cells, which are formed to a depth in the silicon layer (3) until the electrically conductive layer (2) which forms the back electrode (2) is exposed; and
(g) applying a metallic grid structure (8, 9) to the surface of said silicon layer (3) with a silk screening method, such that the grid structure (8, 9) forms a front electrode (9) and also forms an electrical contact (8) to the back electrode (2) of the respectively neighboring strip cell that lies exposed through holes (7).

4,879,252

SEMICONDUCTOR DEVICE AND A METHOD OF MANUFACTURING THE SAME

Shigeru Komatsu, Kitakyushu, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 25, 1988, Ser. No. 148,332
Claims priority, application Japan, Jan. 27, 1987, 62-15223
Int. Cl.[4] H01L *21/265*
U.S. Cl. 437—31 **6 Claims**



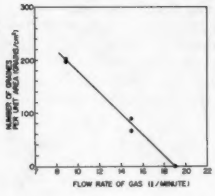
1. A method of manufacturing a semiconductor device comprising the steps of:
forming an insulating layer in a semiconductor substrate, for defining a semiconductor region of a first conductivity type separated from other semiconductor regions;
forming a first silicon dioxide layer, a silicon nitride layer and a first polysilicon semiconductor layer of the first conductivity type and a high impurity concentration on said semiconductor region in a successive manner in the order specified, and patterning these layer to form a layered structure on an emitter forming region;
forming a second polysilicon semiconductor layer on the semiconductor structure, and patterning the second layer;
implanting impurity ions of a second conductivity type into said second polysilicon semiconductor layer;
thermally heating the semiconductor structure resulting from the previous step to diffuse the impurity implanted in said second polysilicon semiconductor layer into said semiconductor region, so that a first region of the second conductivity type, which is in contact with said insulating layer and is between the insulating layer and the emitter forming region is formed in said semiconductor region, and to diffuse the impurity inplanted in said first polysilicon semiconductor layer into that portion of said second polysilicon semiconductor layer, to change the conductivity type of said portion of said first polysilicon semiconductor layer from said second conductivity type to said first conductivity type;
removing said first polysilicon semiconductor layer and said portion of the first conductivity type of said second polysilicon semiconductor layer;
thermally heating the semiconductor structure to form a second silicon dioxide layer on said first polysilicon layer to be thicker than said first silicon dioxide layer under said silicon nitride layer;
removing said silicon nitride layer and said first silicon dioxide layer to expose said semiconductor region;
forming a third polysilicon semiconductor layer on the semiconductor structure, and patterning the third layer;
implanting impurity ions of the second conductivity type into said third polysilicon semiconductor layer, and thermally heating the third layer to diffuse the impurity implanted therein into said semiconductor region to form a second region of the second conductivity type acting as an active base region in contact with said first region of the second conductivity type; and
forming a region of the first conductivity type acting as an emitter region in a part of said second region of the second conductivity type by implanting impurity ions of the first conductivity type into said third polysilicon semiconductor layer, and thermally heating the third structure.

4,879,253

METHOD FOR FABRICATING A SEMICONDUCTOR DEVICE USING A BPSG LAYER CONTAINING HIGH CONCENTRATIONS OF PHOSPHORUS AND BORON

Hidetoshi Wakamatsu, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Sep. 27, 1988, Ser. No. 250,135
Claims priority, application Japan, Sep. 28, 1987, 61-240629
Int. Cl.[4] H01L *21/90*
U.S. Cl. 437—41 **10 Claims**



6. A method for fabricating a semiconductor device including an insulating borophosphosilicate glass layer, the method comprising the steps of:
(a) providing a semiconductor substrate having an element region and a separation region thereon by formation of a thermally oxidized SiO_2 film;
(b) forming a gate insulating film on the element region;
(c) forming a first conductive layer over the construction obtained in the above step;
(d) removing the first conductive layer and the gate insulating layer selectively to expose part of the substrate;
(e) forming a diffusion layer on the exposed portions of the semiconductor substrate;
(f) forming, over the entire surface of the substrate obtained the above step, a borophosphosilicate glass layer which contains about 2 to 5 wt % of boron and about 5 to 8 wt % of phosphorus provided that the total content is in the range of from 7 to 10 wt %;
(g) subjecting the substrate to thermal treatment at a temperature of not lower than 940° C. format least 15 minutes in an atmospheric gas supplied at a flow rate of not lower than 19 liters/minute so that the borophosphosilicate glass layer becomes smooth on the surface thereof without formation of undesirable grains on the surface;
(h) forming an opening in the smooth borophosphosilicate layer; and

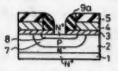
(i) forming a second conductive layer on a region including the opening.

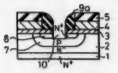
4,879,254

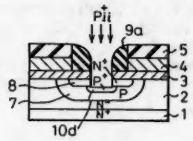
METHOD OF MANUFACTURING A DMOS

Yukio Tsuzuki, Nukata, and Masami Yamaoka, Anjo, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jun. 9, 1988, Ser. No. 204,375
Claims priority, application Japan, Jun. 10, 1987, 62-144245
Int. Cl.[4] H01L *21/316*
U.S. Cl. 437—41 7 Claims







1. A method of manufacturing a semiconductor device, which comprises the steps of:

forming a first conductivity-type layer, having a low impurity atom concentration, on one main surface of a substrate;

forming a first insulating layer on one main surface of said first conductivity-type layer followed by forming a gate electrode layer and a second insulating layer successively on a region of said first insulating layer;

forming, in said first conductivity-type layer, both a second conductivity-type region and a first conductivity-type region having a narrower width than that of said second conductivity-type region by doping impurities into said first conductivity-type layer utilizing said second insulating layer as a mask:

forming a side wall of an insulating material on at least a side portion of said gate electrode layer;

forming a conductive portion penetrating through said first conductivity-type region and extending into said second-conductivity-type region utilizing said second insulating layer and said insulating material on said side wall as a mask;

excessively etching said insulating material on said side wall, said first insulating layer, and said second insulating layer to widen an area defined by said side wall;

forming a first electrode electrically connected to said first conductivity-type region and said second-conductivity-type region through said conductive portion on a main surface of said first conductivity-type layer; and

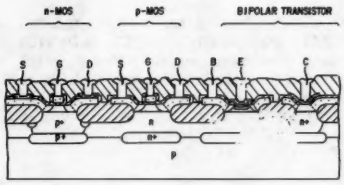
forming a second electrode on an opposite side of a main surface of said substrate.

4,879,255

METHOD FOR FABRICATING BIPOLAR-MOS DEVICES

Tatsuya Deguchi, and Fumitake Mieno, both of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 1, 1988, Ser. No. 200,863
Claims priority, application Japan, Jun. 4, 1987, 62-140351
Int. Cl.[4] H01L *21/225, 21/76*
U.S. Cl. 431—59 2 Claims



1. A method for fabricating a bipolar-MOS (metal oxide semiconductor) device including an n channel MOS-FET (field effect transistor), a p channel MOS-FET and an npn bipolar transistor, each fabricated in a silicon single crystal layer grown in openings formed in a field oxide layer covering a silicon substrate, said process comprising the steps of:

(a) forming a field oxide layer over said silicon substrate, said field oxide layer having openings at the portions where said n channel MOS-FET, p channel MOS-FET and said npn bipolar transistor are fabricated;

(b) growing epitaxial single crystal silicon layers over the surfaces of said substrate exposed in said openings, simultaneously growing a polysilicon layer over said field oxide layer;

(c) patterning said polysilicon layer so as to separate into said single crystal silicon layers and adjacent polysilicon layers thereof, said separate adjacent polysilicon layers being source and drain contact regions of said n channel MOS-FET and p channel MOS-FET, and base and collector contact regions of said bipolar transistor;

(d) forming gate electrodes on said single crystal silicon layers with a gate oxide film at the portions where said n channel and p channel MOS-FET are fabricated, and forming a base mask layer on said single crystal silicon layer adjacent to said base contact region;

(e) selectively implanting p type impurities into said single crystal silicon layers and said adjacent polysilicon layers by ion implantation by using said gate electrode on said p channel MOS-FET portion and said base mask layer as masks so as to form a source region and a drain region in said single crystal silicon layer for said p channel MOS-FET and said source contact region and said drain contact region in said adjacent polysilicon layer for said p channel MOS-FET, and to form said base contact region in said adjacent polysilicon layer for said pnp bipolar transistor and an external base region in said single crystal silicon layer for said pnp bipolar transistor;

(f) selectively implanting n type impurities into said single crystal silicon layers and said adjacent polysilicon layers by ion implantation by using said gate electrode on said n channel MOS-FET portion as a mask so as to form a source region and a drain region in said single crystal silicon layer for said n channel MOS-FET and said source contact region and said drain contact region in said adjacent polysilicon layer for said p channel MOS-FET, and to form a collector contact area in said single crystal silicon layer for said npn bipolar transistor and said collector contact region in said adjacent polysilicon layer for said npn bipolar transistor;

(g) removing said base mask layer;

(h) introducing p-type impurities into said single crystal silicon layer in which said external base region is formed

so as to form an internal base region extending to said external base region; and

(i) selectively introducing n type impurities into said internal base region to form an emitter region in said internal base region, wherein a vertical non bipolar transistor is formed in said single crystal silicon layer on the npn bipolar transistor portion.

4,879,256

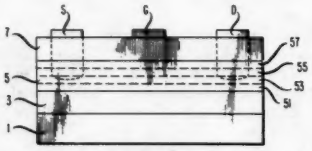
METHOD OF CONTROLLING THE ORDER-DISORDER STATE IN A SEMICONDUCTOR DEVICE

John C. Bean, New Providence, and Abbas Ourmazd, Middletown, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 28, 1989, Ser. No. 331,063

Int. Cl.[4] H01R *21/20*

U.S. Cl. 437—131 **6 Claims**



1. In the manufacture or use of a semiconductor device, a method for ordering at least a disordered portion of at least one semiconductor-alloy epitaxial layer comprising Ge_xSi_{1-x}, x greater than or equal to 0.0 and less than or equal to 1.0, said method comprising a step of heating said portion to a temperature which lies below a critical temperature, said heating being applied as said layer is in a strained state.

4,879,257

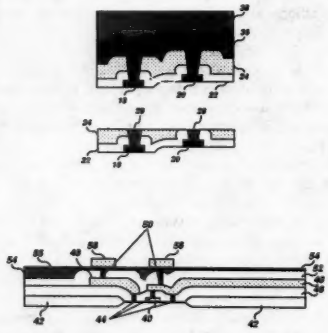
PLANARIZATION PROCESS

Roger Patrick, Palo Alto, Calif., assignor to LSI Logic Corporation, Milpitas, Calif.

Filed Nov. 18, 1987, Ser. No. 122,245

Int. Cl.[4] H01L *21/283, 21/316*

U.S. Cl. 437—195 **12 Claims**



11. A method for manufacturing a multilayer integrated circuit comprising:

(a) forming a plurality of components on an integrated circuit substrate to form a first component layer;

(b) forming a layer of interconnecting metallization over said components;

(c) depositing a first layer of dielectric material over said metallization layer;

(d) depositing a second layer of dielectric material over said first layer of dielectric material;

(e) masking said second dielectric layer wherein said mask permits etching in those areas where a contact with said first layer of interconnecting metallization is desired;

(f) etching to produce cavities through said first and second dielectric layers wherein said cavities expose said first layer of interconnecting metallization in those areas where contact with said first layer of interconnecting metallization is desired;

(g) filling said cavities with metal to form metal filled cavities;

(h) depositing a layer of photoresist over said second dielectric layer and said metal filled cavities;

(i) etching the integrated circuit with a chemistry which etches dielectric, metal and photoresist at substantially the same rate wherein said etching removes said photoresist and portions of said dielectric and metal filled cavities to expose said metal filled cavities and produce a top surface on said integrated circuit which is substantially planar;

(j) depositing another interconnecting metallization layer on said planar surface wherein said metallization layer contacts said metal filled cavities in selected areas; and

(k) Repeating steps (c) through (j) to form additional layers of interconnecting metallization patterns.

4,879,258

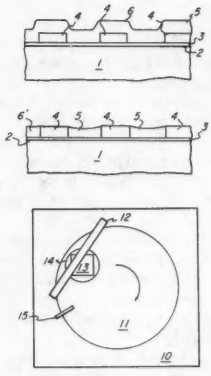
INTEGRATED CIRCUIT PLANARIZATION BY MECHANICAL POLISHING

Wayne G. Fisher, Allen, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 31, 1988, Ser. No. 238,954

Int. Cl.[4] H01L *21/304, 21/306*

U.S. Cl. 437—225 **7 Claims**



1. A process for producing a substantially planar surface on a semiconductor wafer after said wafer has been polished and subsequent processing has been accomplished which results in a nonplanar surface, comprising the steps of:

contacting said nonplanar surface of said wafer to an abrasive by a substantially constant pressure;

moving said wafer and said abrasive relative to each other for a time period while maintaining said substantially constant pressure to cause mechanical removal of material from said wafer;

monitoring the composition of said removed material, and;

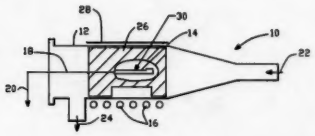
releasing said wafer and said abrasive from contact when a predetermined composition is detected.

4,879,259

RAPID THERMAL ANNEALING OF GALLIUM ARSENIDE WITH TRIMETHYL ARSENIC OVERPRESSURE

Scott K. Reynolds, San Mateo County; Dietrich W. Vook, Santa Clara, and James F. Gibbons, Santa Clara County, all of Calif., assignors to The Board of Trustees of the Leland Stanford Junion University, Stanford, Calif.

Continuation of Ser. No. 101,462, Sep. 28, 1987, abandoned. This application Feb. 1, 1989, Ser. No. 306,268
Int. Cl.[4] H01L *21/383*
U.S. Cl. 437—247 9 Claims



1. A method of rapid thermal annealing of a silicon implanted Ga/As wafer comprising the steps of

locating and supporting the Ga/As wafer within an annealing chamber,

introducing arsenic from a gas source into said furnace in the region surrounding wafer,

heating the walls of said annealing chamber more rapidly than said wafer to create a wall temperature higher than the condensation point of said arsenic, preventing arsenic condensation on the walls,

annealing said wafer in said arsenic atmosphere to achieve a high activation efficiency.

4,879,260

ALUMINA-ZIRCONIA CERAMIC

William R. Manning, Richmond, Mich., assignor to Champion Spark Plug, Toledo, Ohio

Continuation-in-part of Ser. No. 893,609, Aug. 6, 1986, Pat. No. 4,751,207. This application Jun. 8, 1988, Ser. No. 204,597
The portion of the term of this patent subsequent to Jun. 14, 2005, has been disclaimed.
Int. Cl.[4] C03C *14/00*; C04B *35/10, 35/48*
U.S. Cl. 501—32 6 Claims

1. A ceramic consisting essentially of from 1 to 15 percent of glass and 99 to 85 percent of a mixture of particulate Al_2O_3 and particulate ZrO_2, the particulates all being finer than 15 microns in ultimate particle size, ZrO_2 constituting from ¼ to 4 percent based upon the weight of ZrO_2 and Al_2O_3 in the ceramic, and said glass constituting a vitreous phase bonding the particulates into a dense, gas impervious structure, and being a calcium magnesium silicate glass containing from 45 to 80 percent of SiO_2, from 8 to 55 percent of CaO and MgO, and not more than 15 percent of Al_2O_3.

4,879,261

LOW DIELECTRIC CONSTANT COMPOSITIONS

Ian Burn, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 3,259, Jan. 13, 1987, Pat. No. 4,766,027. This application Aug. 23, 1988, Ser. No. 236,072
Int. Cl.[4] C03C *14/00*
U.S. Cl. 501—32 8 Claims

1. An alkali-free composition for forming a ceramic dielectric body having a dielectric constant less than 5.0, which is a mixture of finely divided particles consisting essentially of:

(a) 70–85% by weight silica particles and

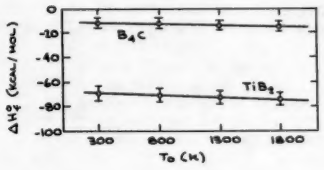
(b) 15–30% by weight zinc borate flux particles.

4,879,262

COMBUSTION SYNTHESIS OF BORIDE AND OTHER COMPOSITES

Danny C. Halverson, Modesto; Beverly Y. Lum, Livermore, and Zuhair A. Munir, Davis, all of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 28, 1988, Ser. No. 225,413
Int. Cl.[4] C04G *35/52*
U.S. Cl. 501—87 12 Claims



1. A combustion synthesis method of forming B_4C rich B_4C/TiB_2 composites, comprising:

forming a powder compact of powdered B, C and Ti, or oxides thereof, or hydrides thereof, or mixtures thereof in ratios which produce a B_4C rich composite of selected B_4C/TiB_2 mole ratio;

preheating the powder compact to a predetermined initial temperature prior to combustion, the temperature being determined by the selected B_4C/TiB_2 mole ratio;

producing a self-propagating combustion wave in the powder compact to produce a B_4C/TiB_2 composite of the selected B_4C rich mole ratio.

4,879,263

SLIDING MEMBER OF HIGH STRENGTH AND HIGH ABRASION RESISTANCE

Katsutoshi Komeya, Kanagawa; Hashimoto, Masahiro, Kamakura; Katsutoshi Nishida, and Michiyasu Komatsu, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 17, 1985, Ser. No. 776,836
Claims priority, application Japan, Sep. 18, 1984, 59-194990
Int. Cl.[4] C04B *35/56*
U.S. Cl. 501—97 5 Claims

1. A sliding member of high strength and high abrasion resistance, preponderantly comprising elongated particles of β-phase silicon nitride and not more than 20% by weight, based on the total amount of said sliding member, of a matrix phase enveloping said silicon nitride particles, said particles having major diameters of not more than 60 μm and aspect ratios of not less than 5, said sliding member having a relative density of not less than 98%, and

said sliding member consisting essentially of silicon nitride and effective amounts of an oxide of a rare earth element, aluminum oxide and a member selected from the group consisting of titanium oxide, zirconium oxide and magnesium oxide, said sliding member formed by mixing not more than 10% by weight of the oxide of a rare earth

element, not more than 10% by weight of aluminum oxide, not more than 5% by weight of at least one member selected from the group consisting of titanium oxide, zirconium oxide and magnesium oxide, (excluding the case wherein both said oxide of rare earth and aluminum oxide both account for 0% by weight) with silicon nitride powder in proportions such that the ratio of said oxide of rare earth element to aluminum oxide will fall in the range of 0.5 to 10, and sintering the resultant mixture.

4,879,264

METHOD OF MAKING CATALYST AND CATALYST PRECURSOR CONTAINING VANADIUM AND ANTIMONY

Mark A. Toft, Lakewood; James F. Brazdil, Jr., Mayfield Village, and Linda C. Glaeser, Lyndhurst, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Nov. 14, 1988, Ser. No. 270,987
Int. Cl.[4] B01J *23/18, 23/22, 35/08*
U.S. Cl. 502—8 20 Claims

1. A method of making a catalyst precursor having vanadium and antimony in oxide form in the atomic ratio of Sb to V in the range from 0.8 to 4, by aging an aqueous solution containing the monoperoxovanadium ion, $VO(O_2)_+$, until a vanadium-containing sol or gel is formed, and reacting said vanadium while in said aqueous sol or gel form, with an antimony compound which contains Sb having a valence of 3, thereby reducing the average valence of the vanadium to less than 5 and oxidizing antimony to a valence state of 5.

4,879,265

HYDROPROCESSING CATALYST AND PHOSPHOROUS AND CITRIC ACID CONTAINING IMPREGNATING SOLUTION

Howard D. Simpson, Irvine, and Pauline B. Borgens, Diamond Bar, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Continuation-in-part of Ser. No. 825,058, Jan. 31, 1986, Pat. No. 4,743,359, which is a division of Ser. No. 595,260, Mar. 30, 1984, Pat. No. 4,568,450, which is a division of Ser. No. 409,583, Aug. 19, 1982, Pat. No. 4,455,390. This application May 10, 1988, Ser. No. 192,379
Int. Cl.[4] B01J *27/19, 27/185, 21/04*; C10G *45/08*
U.S. Cl. 502—211 44 Claims

1. A catalytic composition prepared by the method comprising the steps of (1) impregnating porous refractory support particles with an aqueous impregnating solution comprising (a) one or more Group VIB metal components, (b) one or more phosphorus components and (c) citric acid, said citric acid in a mole ratio to said Group VIB metal components calculated as the Group VIB metal trioxide of less than 1 to 1, said solution having a pH less than 1.0 and (2) calcining the impregnated support particles to produce a catalytic composition containing a Group VIB metal component and a phosphorus component on said porous refractory oxide support.

4,879,266

CATALYST FOR PREPARATION OF DIMETHYL CARBONATE

Ajit K. Bhattacharya, Hopewell Junction, N.Y., assignor to Texaco Inc., White Plains, N.Y.

Division of Ser. No. 652,246, Sep. 20, 1984, Pat. No. 4,785,130. This application Jul. 14, 1988, Ser. No. 218,766
Int. Cl.[4] B01J *31/02*
U.S. Cl. 502—164 11 Claims

1. A composition of matter comprising

(a) a copper hydrocarbonoxy halide Cu(OR')X wherein R' is a hydrocarbon group selected from the group consisting of alkyl, alkaryl, aralkyl, cycloalkyl, and aryl and X is halide; and

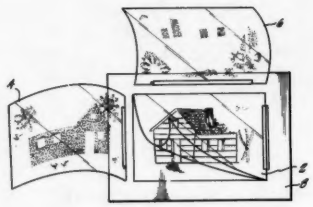
(b) at least one second component selected from the group consisting of BX_3, BR'_3, $B(OR')_3$, $R'R_3PX$, and $R'R_3NX$ wherein R is selected from the same group as R'.

4,879,267

METHOD FOR COLOR AND BLACK AND WHITE REPRODUCTION AND FORMULATION USED THEREWITH

Charles P. Collier, Santa Barbara, Calif., assignor to Fluorographic Services, Inc., Santa Barbara, Calif.

Filed Dec. 14, 1987, Ser. No. 132,401
Int. Cl.[4] B41M *5/16*
U.S. Cl. 503—201 16 Claims



1. A method of photographic color reproduction of artwork comprising:

adding a solution comprising a colorless coloring agent to colored art materials;

preparing a drawing using said colored art materials with the colorless coloring agent incorporated therein;

sraying the artwork with an acidic spray which causes the colorless coloring agent to become colored;

photographically reproducing the drawing; and

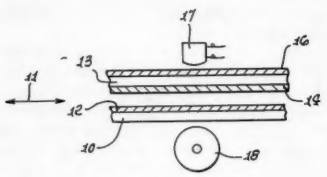
restoring the artwork to its original color by applying an alkaline solution to the artwork.

4,879,268

MULTIPLE DOCUMENT PARALLEL PRINTING APPARATUS

Dunstan P. Sheldon, 1752 W. Altadena, Altadena, Calif. 91001

Filed Mar. 30, 1987, Ser. No. 31,703
Int. Cl.[4] B41M *5/22*
U.S. Cl. 503—201 2 Claims



1. In the method of thermal printing on multiple sheets and employing a thermal head, the steps including

(a) providing a first paper sheet having a coating on one side thereof, the coating consisting of color developer,

(b) providing a separate and second paper sheet having a leuco dye coating on one side thereof and bringing the sheets together to locate the dye coating in facing relation to the color developer layer, to contact same, the second paper sheet readily separable from the first paper sheet.

(c) providing said thermal head to contain electrically heated elements forming alphanumeric or graphic characters,

(d) the second paper sheet provided with a thermal coating at the opposite side thereof, the thermal coating contain-

ing a leuco dye and color developer therefor characterized as becoming exposed at locations where heat is applied to said coating from the heated elements at the thermal head,

(e) and providing a backer and locally urging said sheets relatively toward one another between said thermal head and the backer while traveling the sheets lengthwise together relative to the head and backer, at between 1 and 2 inches per second and while locally and simultaneously transferring heat from said head elements to said sheets, via the thermal coating,

(f) said backer comprising a roller, and said sheets being held in adjacent relation between said head and roller,

(g) said roller being elongated, and including the step of orienting said roller widthwise of said sheets which are elongated and traveled lengthwise relative to the head and roller.

4,879,269

PRESSURE SENSITIVE COPY MATERIAL

Naoya Takahashi, Yokohama; Satoshi Narui, Ayase, and Eiichi Matsuzaka, Kawasaki, all of Japan, assignors to Nippon Petrochemicals Co., Ltd., Japan

Continuation of Ser. No. 946,535, Dec. 24, 1986, abandoned. This application Apr. 3, 1989, Ser. No. 333,791

Claims priority, application Japan, Dec. 26, 1985, 60-297156

Int. Cl.[4] B41M *5/16, 5/22*

U.S. Cl. 503—213 **8 Claims**

1. A pressure sensitive copy material using an electron accepting developer and an electron donating coupler which develops a color by contacting with said developer, said pressure sensitive copy material being characterized by employing phenyl-sec-butylphenyl-methane as a solvent for said electron donating coupler, wherein at least 60% of the phenyl-sec-butylphenyl-methane is the meta- or para-isomer or a mixture thereof.

4,879,270

METHOD OF FORMING SUPERCONDUCTING CERAMICS BY ELECTRODEPOSITION

MacRae Maxfield, Plainfield; Ray H. Baughman, Morris Plains; Zafar Igbal, Morristown, and Helmut Eckhardt, Madison, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Apr. 29, 1988, Ser. No. 188,772

Int. Cl.[4] H01L *39/00;* C25D *5/02*

U.S. Cl. 505—1 **10 Claims**

1. In a method of forming deposits of superconducting ceramics comprising the steps of (a) electrodepositing onto a substrate a mixture of metals, of the type and in proportions sufficient to be oxidized into ceramic, and (b) oxidizing said electrodeposited mixture on said substrate, under conditions sufficient to result in a superconducting ceramic deposit, the improvement wherein the electrodepositing step is conducted in a manner such that a patterned deposit results, with said oxidation step being conducted on said patterned deposit to result in a patterned superconducting deposit.

4,879,271

SCHIFF BASE REACTION PRODUCTS OF ALKYL ANTHRANILATES AND ORGANOLEPTIC USES THEREOF AND DEODORANCY USES THEREOF

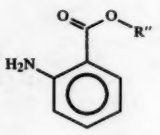
Braja D. Mookherjee, Holmdel; Robert W. Trenkle, Point Pleasant, both of N.J.; Nicholas Calderone, Laurel Hollow, N.Y., and Keith P. Sands, Marlboro, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 171,778, Mar. 22, 1988, Pat. No. 4,806,363. This application Oct. 7, 1988, Ser. No. 255,023

Int. Cl.[4] A61K *7/46*

U.S. Cl. 512—20 **12 Claims**

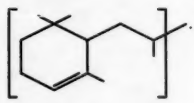
1. A schiff base reaction product produced according to the process of reacting an alkyl anthranilate having the structure:



wherein R″ represents methyl or ethyl with a carbonyl-containing compound having the structure:

wherein R′ represents hydrogen or methyl and R is a moiety selected from the group consisting of:

and



9. A process for augmenting or enhancing the aroma of a perfume composition, cologne or perfumed article comprising the step of intimately admixing with said perfume composition, cologne or perfumed article, an aroma augmenting or enhancing quantity of the schiff base reaction product defined according to claim 1.

4,879,272

METHOD AND COMPOSITION FOR PREVENTING THE ADSORPTION OF A MEDICINE

Naoto Shimoda, and Tsutomu Kawaguchi, both of Saitama, Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 4, 1985, Ser. No. 784,640

Claims priority, application Japan, Oct. 9, 1984, 59-210460

The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.

Int. Cl.[4] A61K *37/02;* C07K *15/14*

U.S. Cl. 514—8 **4 Claims**

1. A method of preventing erythropoietin in an aqueous solution from being adsorbed on the inner surface of the wall of a container by incorporating in the aqueous solution one or more additives selected from the group consisting of human serum albumin and bovine serum albumin.

4,879,273

GLUCAGON HOMOLOGS AND THERAPEUTIC USE THEREOF

Robert B. Merrifield, Cresskill, N.J., assignor to The Rockefeller University, New York, N.Y.

Filed May 22, 1987, Ser. No. 53,407
Int. Cl.[4] A61K *37/28*; C07K *7/10, 7/34*
U.S. Cl. 514—12 16 Claims

1. des-His[1]-[Glu[9]] glucagon.

4,879,274

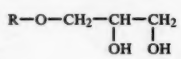
EXTERNAL MEDICATION FOR SKIN

Tetsuro Kamiya; Shuichi Tsuchiya, and Kenji Hara, all of Utsunomiya, Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Sep. 12, 1986, Ser. No. 906,375
Claims priority, application Japan, Sep. 27, 1985, 60-213961
Int. Cl.[4] A61K *47/00*
U.S. Cl. 514—12 20 Claims

1. An external medication comprising as essential components:

(A) an α-monoglyceryl ether having formula (I):



(I)

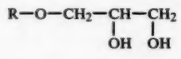
wherein R is a C_{10-24} alkyl or alkenyl group;

(B) a physiologically active material selected from the group consisting of corticosteroids, antimicrobial agents, fungicidal agents, vitamins, antihistamines, local anesthetics and coronary vasodilators; and

(C) an oily material which is in the form of a liquid or paste at 15° C.

2. An external medication comprises as essential components:

(A) an α-monoglyceryl ether having the formula



(I)

wherein R is C_{10-24} alkyl or alkenyl group;

(B) a physiologically active material selected from the group consisting of acetaminophen, acetylsalicylic acid, methyl salicylate, glycol salicylate, mefenamic acid, flufenamic acid, indomethacin ibuporfen, diclofenac, alclofenac, oxyphenbutazoone, phenylbutazone, allantoin, l-menthol, camphor, guaiazulene, azulene, glycyrrhetic acid, dipotassium glycyrrhetiate, tinoridine hydrochloride, 5-fluorourasil, cyclophosphamide, busulfan, actinomycin, morphine, codeine, nalorphine, pentazocine, barbital, thiopental, chlorpromazine, reserpine, estradiol, and methyltestosterone; and

(C) an oily material which is in the form of a liquid or paste at 15° C.

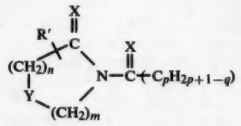
4,879,275

PENETRATION ENHANCERS FOR TRANSDERMAL DELIVERY OF SYSTEMIC AGENT

Gevork Minaskanian, Irvine, and James V. Peck, Costa Mesa, both of Calif., assignors to Nelson Research & Development Co., Irvine, Calif.

Continuation-in-part of Ser. No. 103,445, Sep. 30, 1987. This application May 27, 1988, Ser. No. 199,454
Int. Cl.[4] A01N *31/19, 31/40, 43/36*
U.S. Cl. 514—24 13 Claims

1. A method for topically enhancing penetration of systemically active agents through the skin or mucosal membranes of humans and animals and into the bloodstream, wherein said method comprises the topical administration of an effective amount of a systemically active agent and an effective systemic penetrating amount of a membrane penetration enhancer having the structural formula



wherein X represents sulfur, oxygen or 2 hydrogen radicals; Y represents —CH_2—, —NH—or oxygen; n and m are integers of from 1 to 3; p is an integer of from 3 to 17; wherein $p \geq 9$; q is 2, 4, 6 or 8; and R′ is selected from the group consisting of H, a lower alkyl group having from 1 to 4 carbon atoms, phenyl, lower alkyl or halogen substituted phenyl, acetamido, halogen, piperidinyl, lower alkyl or halogen substituted piperidinyl, carbalkoxy, carboxamide, and alkanoyl.

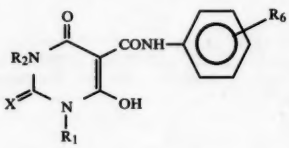
4,879,276

METHOD FOR REDUCING SERUM URIC ACID LEVELS

Arthur D. Brewer, Puslinch, Canada, assignor to Uniroyal Chemical Ltd./Uniroyal Chemical Ltee, Don Mills, Canada

Continuation-in-part of Ser. No. 919,922, Oct. 16, 1987, abandoned, which is a continuation of Ser. No. 827,479, Feb. 5, 1986, abandoned, which is a continuation of Ser. No. 699,720, Mar. 21, 1985, abandoned, which is a continuation of Ser. No. 65,267, Oct. 26, 1984, abandoned, which is a continuation-in-part of Ser. No. 562,693, Dec. 19, 1983, abandoned. This application Jan. 11, 1988, Ser. No. 142,626
Int. Cl.[4] A61K *31/70, 31/505, 31/515*
U.S. Cl. 514—43 2 Claims

1. A method for reducing serum uric acid levels in a mammal, which comprises administering to the mammal an effective amount of a compound of the formula:



wherein

R_1 and R_2 may each independently be hydrogen; alkyl, or phenyl, phenalkyl, phenalkenyl or phenalkynyl, the alkyl, alkenyl or alkynyl moieties of which have from one to six carbon atoms;

R_6 is at least one substituent selected from the group consisting of hydrogen; halogen; alkyl, alkenyl, alkynyl, alkoxy or phenyl, phenalkyl, phenalkenyl or phenalkynyl, the alkyl, alkenyl, alkynyl or alkoxy moieties of which have from one to six carbon atoms;

X is oxo or thioxo; and the pharmaceutically acceptable addition salts thereof.

4,879,277

ANTIVIRAL COMPOSITIONS AND METHODS

Hiroaki Mitsuya, Rockville, and Samuel Broder, Bethesda, both of Md., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Continuation-in-part of Ser. No. 2,898, Jan. 13, 1987, abandoned, which is a continuation-in-part of Ser. No. 937,925, Dec. 4, 1986, abandoned, which is a continuation-in-part of Ser. No. 769,017, Aug. 26, 1985, abandoned. This application Aug. 11, 1987, Ser. No. 84,054
Int. Cl.[4] A61K *31/70*; C07D *473/16*
U.S. Cl. 514—49 17 Claims

1. A method for treating a patient infected with HIV com-

prising administering to said patient an effective amount of a composition comprising 2',3'-dideoxycytidine, a salt, or an ester thereof in a pharmaceutically acceptable carrier.

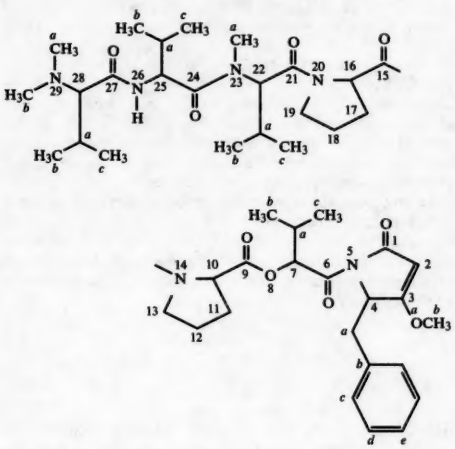
4,879,278

ISOLATION AND STRUCTURAL ELUCIDATION OF THE CYTOSTATIC LINEAR DEPSIPEPTIDE DOLASTATIN 15

George R. Pettit, Paradise Valley, and Yoshiaki Kamano, Tempe, both of Ariz., assignors to Arizona Board of Regents, Tempe, Ariz.

Filed May 16, 1989, Ser. No. 352,851
Int. Cl.[4] A61K *37/02*; C07K *7/06*
U.S. Cl. 514—17 8 Claims

1. A cell growth inhibitory substance denominated dolastatin 15 and having the structural formula:



4,879,280

DIALYSIS SOLUTION FOR USE IN INTRAPERITONEAL DIALYSIS

Günther Seyffart; Wolfgang Rothe, both of Oberursel; Volker Bartz, Giessen, all of Fed. Rep. of Germany, and Volker Bartz, Giessen, all of Fed. Rep. of Germany, assignors to Fresenius AG, Bad Homburg, Fed. Rep. of Germany

Continuation of Ser. No. 420,574, Sep. 20, 1982, abandoned. This application Oct. 4, 1985, Ser. No. 783,802
Claims priority, application Fed. Rep. of Germany, Sep. 24, 1981, 3138104
Int. Cl.[4] A61K *31/70*
U.S. Cl. 514—53 8 Claims

1. A method of intraperitoneal dialysis comprising:

introducing an aqueous composition into the patient's abdomen such that said composition makes its way into the peritoneal cavity of said patient, said composition comprising:

a saccharide as an osmotically active substance and at least one substance for regulating the electrolyte balance in the patient, said saccharide is selected from the group consisting of lactose, saccharose, trehalose, celloboise, gentioboise, meliboise, rutinose, inulin, pectin, and raffinose, the amount of said saccharide being sufficient such that the said composition has an osmotic pressure of 300 to 700 mosm/l.

4,879,281

ARTIFICIAL SALIVA COMPOSITION

Ken-ichiro Shibasaki, Chiba; Hiroshi Itoi, Kamagaya; Shouichi Ohkubo, Tokyo, and Hiroshi Sano, Narashino, all of Japan, assignors to Lion Corporation, Tokyo, Japan

Filed Mar. 18, 1987, Ser. No. 27,388
Claims priority, application Japan, Mar. 24, 1986, 61-66135
Int. Cl.[4] A61K *31/70*
U.S. Cl. 514—55 5 Claims

1. A method of treating hydrodipsia comprising orally administering to a subject suffering from hydrodipsia an artificial saliva composition consisting essentially of at least one buffering compound selected from the group consisting of chitins and chitosans in a medium suitable for an oral composition.

4,879,282

MEDICAL APPLICATION FOR HEPARIN AND RELATED MOLECULES

Michael J. Saliba, Jr., 5582 Thunderbird La., La Jolla, Calif. 92037

Filed Mar. 17, 1987, Ser. No. 27,195
Int. Cl.[4] A61K *31/725*, *31/70*
U.S. Cl. 514—56 8 Claims

1. A method for facilitating transplanting organs, tissues or cells, comprising:

contacting said organs, tissues or cells with a first composition consisting essentially of compounds selected from the group consisting of heparin, heparinoids, and heparin sulfate in a first physiologically acceptable solution having an acidic pH and at a concentration of about 1,500–5,000 units per milliliter, prior to removal of said organs, tissues or cells from a donor patient;

contacting said organs, tissues or cell removed from said donor patient with a second composition consisting essentially of compounds selected from the group consisting of heparin, heparinoids or heparin sulfate in a physiologically acceptable solution having an acidic pH and at a concentration of about 1,500–40,000 units per milliliter; and

transplanting said organs, tissues or cells into a recipient patient, said recipient patient being treated with a third composition consisting essentially of heparin, heparinoids or heparin sulfate in a physiologically acceptable solution in an amount effective to inhibit rejection of said organs, tissues or cells from said recipient patient and reducing the requirement for immunosuppressive drugs.

4,879,283

SOLUTION FOR THE PRESERVATION OF ORGANS

Folkert D. Belzer, and James H. Southard, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Continuation-in-part of Ser. No. 784,435, Oct. 3, 1985, Pat. No. 4,798,824. This application Dec. 29, 1987, Ser. No. 139,530
The portion of the term of this patent subsequent to Jan. 17, 2006, has been disclaimed.
Int. Cl.[4] A61K *31/715*
U.S. Cl. 514—60 12 Claims

1. A solution for the preservation and storage of organs intended for implantation in a patient requiring such implantation, comprising:

a pharmacologically acceptable storage solution having a solution osmolality of about 320 mOsm/liter and including a lactobionate salt; and

about 5 weight percent hydroxyethyl starch, wherein said starch is substantially free of ethylene glycol, ethylene chlorohydrin, sodium chloride and acetone and has a molecular weight of from about 150,000 to about 350,000 daltons.

4,879,284

NAPHTHALENE DERIVATIVES HAVING RETINOID TYPE ACTION, THE PROCESS FOR PREPARATION THEREOF AND MEDICINAL AND COSMETIC COMPOSITIONS CONTAINING THEM

Gérard Land, Saint-Gratien; Jean Maignan, Tremblay les Gonesse; Serge Restle, Aulnay Sous Bois, and Gérard Malle, Villiers S/Morin, all of France, assignors to L'Oreal, Paris, France

PCT No. PCT/FR86/00123, § 371 Date Dec. 5, 1986, § 102(e) Date Dec. 5, 1986, PCT Pub. No. WO86/06064, PCT Pub. Date Oct. 23, 1986

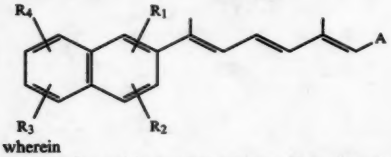
PCT Filed Apr. 14, 1986, Ser. No. 2,708

Claims priority, application France, Apr. 15, 1985, 85 05606

Int. Cl.[4] C07C *57/42, 103/58;* A61K *7/00, 31/19*

U.S. Cl. 514—62 18 Claims

1. A chemical compound having the formula



(VI)

wherein

R_1, R_2, R_3, and R_4 are distributed on either of the rings or on both at once and are each, independently, selected from the group consisting of hydrogen, a linear or branched C_1–C_6 alkyl, OH and C_1–C_6 alkoxy; and

A is selected from the group consisting of

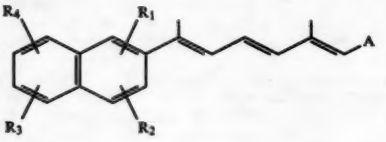
(i) —COR_5 wherein R_5 is selected from the group consisting of hydrogen when at least one of R_1 to R_4 is other than hydrogen; C_1–C_6 alkyl; amino; amino mono-or-disubstituted by C_1–C_6 alkyl or by C_1–C_6 alkyl mono-or polysubstituted by OH or by C_1–C_6 alkyl interrupted by one or more hetero atoms selected from the group consisting of O, S, and N, unsubstituted or substituted by one or more OH groups; arylamino; benzylamino; alicyclic amino; and N-heterocyclic amino radical,

(ii) an amide group of an amino acid or of a glucosamine; and

(iii) —$COOR_6$ wherein R_6 is selected from the group consisting of hydrogen, C_1–C_6 alkyl when one of R_1 to R_4 is other than hydrogen, C_1–C_6 mono- or polyhydroxyalkyl, aryl and benzyl, or OR_6 is (i') $C_6H_9O_6$ —radical derived from glucose, (ii') $C_6H_{11}O_6$ —radical derived from mannitol or (iii') $C_{11}H_9O_4$ —radical derived from erythritol;

or an isomer or salt thereof.

5. A medicinal composition comprising in a pharmaceutically acceptable carrier at least one compound having the formula



(VIA)

wherein

R_1, R_2, R_3, and R_4 are distributed on either of the rings or on both at once and are each, independently, selected from the group consisting of hydrogen, a linear or branched C_1–C_6 alkyl, OH and C_1–C_6 alkoxy; and

A is selected from the group consisting of

(i) —COR_5 wherein R_5 is selected from the group consisting of hydrogen when at least one of R_1 to R_4 is other than hydrogen; C_1–C_6 alkyl; amino; amino mono- or disubstituted by C_1–C_6 alkyl or by C_1–C_6 alkyl mono-or polysubstituted by OH or by C_1–C_6 alkyl interrupted by one or more hetero atoms selected from the group consisting of O, S, and N, unsubstituted or substituted by one or more OH groups; arylamino; benzylamino; alicyclic amino; and N-heterocyclic amino radical,

(ii) an amide group of an amino acid or of a glucosamine; and

(iii) —$COOR_6$ wherein R_6 is selected from the group consisting of hydrogen, C_1–C_6 alkyl when one of R_1 to R_4 is other than hydrogen, C_1–C_6 mono- or polyhydroxyalkyl, aryl and benzyl, or OR_6 is (i') $C_6H_9O_6$ —radical derived from glucose, (ii') $C_6H_{11}O_6$ —radical derived from mannitol or (iii') $C_{11}H_9O_4$ —radical derived from erythritol;

or an isomer or salt thereof.

4,879,285

FERTILITY CONTROL

Christopher O'Neill, Greenwich, Australia, assignor to Royal North Shore Hospital and Area Health Service, St. Leonards, Australia, a part interest

Filed Aug. 18, 1987, Ser. No. 86,900

Claims priority, application Australia, Aug. 22, 1986, PH07642

Int. Cl.[4] A61K *31/13, 31/557, 31/66*

U.S. Cl. 514—75 19 Claims

1. A method of controlling fertility in a female mammal in-vivo or in-vitro which comprises artificially varying the concentration of platelet activating factor (PAF) or PAF analogue around the fertilized embryo so as to control cell division and/or implantation in the uterus.

14. A contraceptive composition for reducing fertility in a female mammal which comprises an effective amount of an antagonist for 1-O-alkyl-2-O-acetyl-sn-glycero-3-phosphocholine (platelet activating factor-PAF), and an effective amount of a further post-coital contraceptive agent, together with a pharmacetically acceptable carrier.

4,879,286

CYCLOPHOSPHAMIDE

Abu S. Alam, Libertyville; Kenneth J. Koziol, Bensenville, and John N. Kapoor, Lake Forest, all of Ill., assignors to Lyphomed, Inc., Rosemont, Ill.

Continuation of Ser. No. 8,598, Jan. 28, 1987, abandoned. This application Apr. 4, 1988, Ser. No. 178,761

Int. Cl.[4] A61K *31/66*

U.S. Cl. 514—110 1 Claim

1. A storage-stable, liquid oncolytic formulation for parenteral administration comprising a solution of cyclophosphamide in a substantially anhydrous carrier which comprises about 80 percent propylene glycol and about 20 percent polyethylene glycol, wherein the cyclophosphamide is present in an effective amount up to about one gram per milliliter of solution.

4,879,287

PHARMACEUTICAL COMPOSITION

Norman A. Orr, and Michael J. Greenway, both of Worthing, England, assignors to Beecham Group p.l.c., England

Continuation-in-part of Ser. No. 940,285, Dec. 11, 1986, abandoned. This application Dec. 21, 1988, Ser. No. 288,023

Claims priority, application United Kingdom, Dec. 13, 1985, 8530796

Int. Cl.[4] A61K *31/56*

U.S. Cl. 514—171 6 Claims

1. A pharmaceutical composition for topical application to humans or domestic mammals comprising the hydrated crystalline calcium salt of mupirocin, and a corticosteroid intimately mixed therewith.

4,879,288

NOVEL DIBENZOTHIAZEPINE ANTIPSYCHOTIC

Edward J. Warawa, Wilmington, Del., and Bernard M. Migler, Cherry Hill, N.J., assignors to ICI Americas Inc., Wilmington, Del.

Filed Mar. 20, 1987, Ser. No. 28,473

Claims priority, application United Kingdom, Mar. 27, 1986, 8607684

Int. Cl.[4] C07D *417/04;* A61K *31/555*

U.S. Cl. 514—211 8 Claims

1. A compound of formula II

and acid addition salts thereof.

2. A compound as claimed in claim 1 wherein said acid addition salts are phamaceutically acceptable acid addition salts.

5. A pharmaceutical composition comprising a compound of claim 2 in an amount sufficient to manage a psychotic condition in a living mammal in need of such treatment in association with a non-toxic pharmaceutically acceptable diluent or carrier.

6. A pharmaceutical composition comprising a compound of claim 2 in an amount sufficient to reduce hyperactivity in a living mammal in need of such treatment in association with a non-toxic pharmaceutically acceptable diluent or carrier.

4,879,289

METHOD OF AMELIORATING EPILEPTIC SEIZURES

Ray H. Zobrist, and William R. Morrone, both of Olathe, Kans., assignors to Marion Laboratories, Inc., Kansas City, Mo.

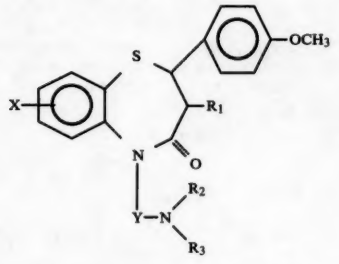
Filed May 24, 1988, Ser. No. 198,054

Int. Cl.[4] A61K *31/55*

U.S. Cl. 514—211 10 Claims

1. A method for ameliorating generalized tonic-colnic type epileptic seizures in mammals comprising systemically administering to a mammal in need of such treatment an effective daily dose of up to 360 mg of a compound having the formula:

I



wherein X is hydrogen, a lower straight chain or branched alkyl, hydroxy, a halogen or a lower straight chain or branched alkyl halide; Y is a lower straight chain or branched alkyl; R_1 is hydrogen, hydroxyl or acetyloxy; R_2 and R_3 are each a lower straight chain or branched alkyl or a non-aromatic cycloalkyl, and pharmaceutically acceptable salts thereof.

4,879,290

AGENTS FOR THE PREVENTION OF RANKING FIGHTS IN PIGS

Peter Kurka, Hilden, and Leppold Goetze, Wuppertal, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

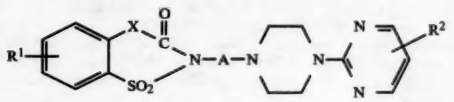
Filed Jun. 6, 1988, Ser. No. 203,039

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1987, 3720074

Int. Cl.[4] A61K *31/54, 31/50*

U.S. Cl. 514—223.2 6 Claims

1. A method of suppressing ranking fights during assembly of groups of pigs which comprises administering to such pigs an amount effective therefor of a 2-pyrimidinyl-1-piperazine derivative of the formula (I)



which

R^1 and R^2 each independently represents at least one radical selected from the groups consisting of hydrogen, C_{1-4}-alkyl, halogen, hydroxyl, nitro, C_{2-4}-alkenyl, C_{1-4}-alkoxy, C_{1-4}-alkylthio, C_{1-4}-halogenoalkyl, C_{1-4}-halogenoalkoxy and C_{1-4}-halogenoalkylmercapto,

X is a direct bond or a radical

R^3 is hydrogen or C_{1-4}-alkyl, and

A is an optionally substituted alkylene radical with up to 6 C atoms,

or a physiologically acceptable salt thereof.

4,879,291

N-ALKYL-2,6-DIMETHYLMORPHOLINOCARBOXAMIDE SALTS, THEIR PREPARATION, AND THEIR USE AS FUNGICIDES

Lothar Banasiak; Wilfried Edlich, both of Potsdam; Horst Lyr, Eberswalde; Eva Nega, and Marianne Sunkel, both of Potsdam-Babelsberg, all of German Democratic Rep., assignors to Institut fuer Pflanzenschutzforschung Kleinmachnow der Akademie der Landwirtschaftswissenshafen der DDR, Kleinmachnow, Fed. Rep. of Germany

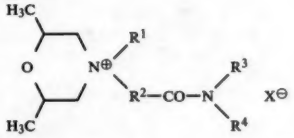
Division of Ser. No. 881,392, Jul. 2, 1986, Pat. No. 4,737,498. This application Dec. 30, 1987, Ser. No. 139,797

Claims priority, application German Democratic Rep., Jul. 5, 1985, 278324

Int. Cl.[4] A01N *43/84;* C07D *265/30*

U.S. Cl. 514—237.8 7 Claims

1. An N-alkyl-2,6-dimethylmorpholinocarboxamide salt of the formula (I)



(I)

wherein, R^1 is a straight-chain or branched alkyl of 6 to 20 carbon atoms, R^2 is a straight-chain or branched alkylene of 1 to 6 carbon atoms, R^3 is hydrogen or a straight-chain or branched alkyl of 1 to 4 carbon atoms, R^4 is monochlorophenyl and X^- is an anion of a non-phytotoxic acid.

4,879,292

CERTAIN-PHENOXY-PHENOXY-ALKYLENE-OXY-PYRIMIDINES OR SYMMETRICAL TRIAZINES, THIO-ANALOGUES THEREOF, HAVING INSECTICIDAL ACTIVITY

Sumio Nishida; Noritada Matsuo, both of Hyogo; Makoto Hatakoshi, Osaka, and Hirosi Kisida, Hyogo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

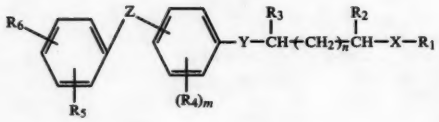
Division of Ser. No. 40,796, Apr. 21, 1987, Pat. No. 4,751,225, which is a continuation of Ser. No. 601,284, Apr. 17, 1984, abandoned. This application Mar. 22, 1988, Ser. No. 171,851

Claims priority, application Japan, Apr. 25, 1983, 59-73400

Int. Cl.[4] C07D *239/30, 251/28;* **A01N** *43/54, 43/66*

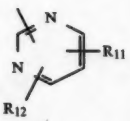
U.S. Cl. 514—241 **37 Claims**

1. A nitrogen-containing heterocyclic compound of the formula:

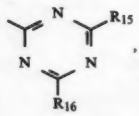


wherein

R_1 is one of the following groups:



or



in which R_{11}, R_{12}, R_{15} and R_{16} are, the same or different, each a hydrogen atom, a halogen atom, a C_1–C_4 alkyl group, a C_1–C_4 alkoxy group, a C_1–C_4 alkylthio group, a trifluoromethyl group or a nitro group;

R_2 and R_3 are, the same or different, each a hydrogen atom, a halogen atom or a methyl group;

R_4 is a halogen atom or a methyl group;

R_5 and R_6 are, the same or different, each a hydrogen atom, a halogen atom, a C_1–C_4 alkyl group, a C_1–C_4 alkoxy group, a C_1–C_4 haloalkyl group or a C_1–C_4 haloalkoxy group;

X, Y and Z are, the same or different, each an oxygen atom, a sulfur atom or a methylene group;

m is an integer of 0 to 4; and

n is an integer of 0 to 2.

27. A method for preventing or exterminating insects which comprises applying an insecticidally effective amount of the compound according to claim 3 to the insects.

4,879,293

PYRROLS [3,4-8]PYRAZINE DERIVATIVES, THEIR PRODUCTION AND USE AS ANTI-ANXIETY AGENTS

Kentaro Hiraga, Nagaokakyo, and Yoshiaki Saji, Kawanishi, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

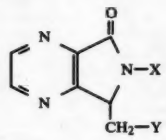
Division of Ser. No. 832,138, Apr. 23, 1986, Pat. No.

Claims priority, application PCT Int'l Appl., Apr. 2, 1982, PCT/JP82/00096; Oct. 7, 1982, PCT/JP82/00401; Feb. 5, 1983, PCT/JP83/00032

Int. Cl.[4] A61K *31/535, 31/505, 31/50, 31/495, 31/445, 31/44, 31/40, 31/41, 31/47;* **C07D** *401/10, 413/14, 409/14*

U.S. Cl. 514—249 **8 Claims**

1. A compound of the formula



wherein X is a cyclic group of the class consisting of phenyl, naphthyl, pyridyl, pyridazinyl, pyrazinyl, pyrimidinyl, quinolyl, naphthyridinyl, thiazolyl, benzothiazolyl or C_{3-7} cycloalkyl, which cyclic group is attached through a carbon atom thereof and is unsubstituted or substituted by one halogen or C_{1-4} alkoxy; and Y is —COOH, —$COOR_1$ or —CO—NR^2R^3, wherein R^1 is C_{1-4} alkyl, phenyl-C_{1-4} alkyl or phenyl, and wherein R^2 and R^3 are the same or different members of the class consisting of hydrogen, C_{1-4} alkyl, phenyl-C_{1-4} alkyl, phenyl, thiazolyl or benzothiazolyl, which are unsubstituted or substituted by a member of the class consisting of halogen, hydroxyl, C_{1-4} alkoxy, C_{2-5} alkoxycarbonyl and di-C_{1-4} alkylamino, or wherein NR^2R^3 is a cyclic group of the class consisting of pyrrolidinyl, piperidino, hexahydroazepinyl, piperazinyl, morpholino or thiazolidinyl, which cyclic group is unsubstituted or substituted by a member of the class consisting of hydroxyl, C_{1-4} alkoxy, C_{1-4} alkyl, C_{2-5} alkoxycarbonyl, phenyl-C_{1-4} alkyl, phenyl, piperidino and pyridyl; or pharmaceutically acceptable salts thereof.

4,879,294

OPTHALMIC COMPOSITION

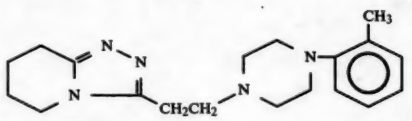
Ronald D. Schoenwald, Iowa City, Iowa, assignor to Angelini Pharmaceuticals Ltd., River Edge, N.J.

Filed Jan. 28, 1988, Ser. No. 149,249

Int. Cl.[4] A61K *31/50, 31/42, 31/40*

U.S. Cl. 514—253 **5 Claims**

1. An ophthalmic composition comprising polydimethylsiloxane with a viscosity of 3–70 centistokkes and a therapeutically effective amount of the ophthalmic drug dapiprazole of the formula



or its non-toxic pharmaceutically acceptable salts thereof.

4,879,295
N-TETRAZOLYL THIAZOLECARBOXYAMIDE DERIVATIVES AND THEIR USE

Junji Yoshinaga, Neyagawa; Takeshi Shoyaki, Suita; Takao Kakita, Toyonaka; Hiromi Ozeki, Osaka; Nobuko Sugimoto, Ashiya, and Yoshiko Kato, Kobe, all of Japan, assignors to Sawai Pharmaceutical Co., Ltd., Japan

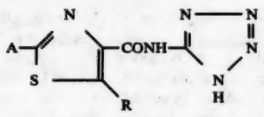
Filed Sep. 17, 1987, Ser. No. 98,015

Claims priority, application Japan, Sep. 27, 1986, 61-229207; Jan. 12, 1987, 62-004541; Jul. 17, 1987, 62-178431

Int. Cl.[4] C07D *417/12, 417/14*

U.S. Cl. 514—255 **8 Claims**

1. A compound of the formula:



wherein

A is C_1–C_6 alkyl group; an aryl group which is unsubstituted or substituted with at least one substituent selected from hydroxy, alkoxy, aryl-(C_1–C_6) alkoxy, C_1–C_6 alkylcarbonyloxy, halo-(C_1–C_6) alkyl, halogen, nitro and amino; a 5- or 6-membered heterocyclic group containing one or two ring hetero atoms selected from the group consisting of oxygen, nitrogen and sulfur; or a condensed heterocyclic group as defined above and a benzene nucleus, the heterocyclic group and the condensed heterocyclic group being unsubstituted or substituted with at least one substituent selected from hydroxy, C_1–C_6 alkyl and halogen and

R is hydrogen or a C_1–C_6 group, or a pharmaceutically acceptable salt thereof, wherein aryl is phenyl, biphenyl, or naphthyl on a C_{1-6}-alkyl substituted phenyl, biphenyl or naphthyl.

4,879,296
XANTHINE DERIVATIVES

Susan M. Daluge, and Harry J. Leighton, both of Chapel Hill, N.C., assignors to Burroughs Wellcome co., Research Triangle Park, N.C.

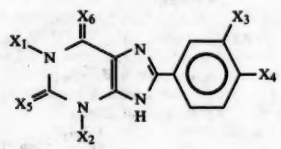
Filed Apr. 25, 1986, Ser. No. 856,719

Claims priority, application United Kingdom, Apr. 27, 1985, 8510758

Int. Cl.[4] C07D *473/06;* A61K *31/52*

U.S. Cl. 514—263 **19 Claims**

1. A compound of formula (I):



(I)

wherein:

X_1 and X_2 are the same or different and are hydrogen, C_{1-6} alkyl, C_{2-6} alkenyl or C_{7-12} aralkyl optionally substituted in the aryl ring by at least one substituent selected from C_{1-6} alkyl, C_{1-6} alkoxy, hydroxy, halo, nitro, amino, azido and cyano, provided that both X_1 and X_2 are not hydrogen;

one of X_3 and X_4 is hydrogen, C_{1-6} alkyl, trifluoromethyl, C_{1-6} alkoxy, halo, nitro, amino, C_{1-6} alkoxycarbonyl or carboxy and the other is a group -Y-Z where Y is C_{2-6} alkenylene, or C_{3-6} alkenylenoxy, C_{2-6} alkynylene or C_{3-6} alkynyleneoxy and Z is carboxy, sulphonyl or pohosphonyl or a C_{1-9} alkyl ester, a C_{7-12} aralkyl ester or a C_{6-12} aryl ester thereof, or is 5-tetrazolyl; and

X_5 and X_6 are the same or different and are oxygen or sulphur;

pharmaceutically acceptable thereof.

4,879,297
FATTY ACIDS AND THEIR SMALL CHAIN ESTERS AS PENETRATION ENHANCERS IN AQUEOUS SYSTEMS

Majid Mahjour, Netcong; Bernadette E. Mauser, Lyndhurst, and Mahdi B. Fawzi, Flanders, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation of Ser. No. 056,520, Jun. 1, 1987, abandoned. This application May 23, 1989, Ser. No. 364,549

Int. Cl.[4] A61V *31/44*

U.S. Cl. 514—282 **10 Claims**

1. A pharmaceutical composition adapted for transdermal delivery of a therapeutically effective amount of a natural or synthetic opioid to the systemic circulation of a mammal consisting essentially of an aqueous suspension containing:

a therapeutically effective amount of a natural or synthetic opioid or a pharmaceutically acceptable salt thereof;

an effective amount of a saturated or unsaturated fatty acid of 8–18 carbon atoms or a C_1–C_4 alkyl ester thereof, and a pharmaceutically acceptable excipient.

4,879,298
NOVEL METHOD AND COMPOSITION

Francoise Delevallee, Fontenay Sous Bois, and Pierre Potier, Paris, both of France, assignors to Roussel Uclaf, Paris, France

Filed Apr. 12, 1988, Ser. No. 180,380

Claims priority, application France, Apr. 15, 1987, 87 05362

Int. Cl.[4] A61K *31/44*

U.S. Cl. 514—282 **6 Claims**

1. A method of relieving pain in warm-blooded animals comprising administering to warm-blooded animals an analgesically effective amount of a central analgesic which is less than that normally used and sufficient forskoline to potentialize the central analgesic simultaneously or successively at times from a few seconds up to 15 hours, the central analgesic; forskoline ratio being 1 part by weight to 0.01 to 20 parts by weight.

4,879,299
TREATMENT OF HEART CONDITIONS WITH SPARTEIN COMPOUNDS

Uwe Schoen, Burgdorf; Wolfgang Kehrbach, Hanover; Bernd Hachmeister, Isernhagen; Gerd Buschmann, Hanover, and Ulrich G. Kuehl, Gehrden, all of Fed. Rep. of Germany, assignors to Kali-Chemie Pharma GmbH, Hanover, Fed. Rep. of Germany

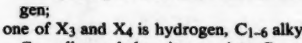
Continuation-in-part of Ser. No. 875,311, Jun. 17, 1986, Pat. No. 4,755,520. This application Dec. 18, 1987, Ser. No. 135,109

Claims priority, application Fed. Rep. of Germany, Jun. 22, 1985, 3522475; Dec. 19, 1986, 3643402

Int. Cl.[4] A61K *31/435;* C07D *471/22*

U.S. Cl. 514—286 **11 Claims**

1. A method of treating a heart condition in a mammal comprising the step of administering to said mammal an effective heart condition improving amount of a spartein derivative corresponding to the Formula (I)



(I)

in which

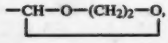
S is a 17-spartein nucleus

n is 0 or 1, and

A is 2-furyl, 2-thienyl or 2-(N-loweralkyl)-pyrryl when n=0, or 3-furyl or 3-thienyl when n=1, or pyridyl, or a phenyl group of the Formula (II)

(II)

in which R_1, R_2 and R_3 are individually selected from the group consisting of hydrogen, lower alkyl containing 1 to 4 carbon atoms, lower alkoxy containing 1 to 4 carbon atoms, chlorine, flourine, fromine trifluoromethyl,



hydroxy, or —CO—R_4 in which R_4 is hydrogen, lower alkoxy containing 1 to 4 carbon atoms, hydroxy, amino or mono-or di-lower alkyl substituted amino, or two adjacent ones of R_1, R_2 and R_3 together form an alkylene dioxy group containing 1 or 2 carbon atoms; or a pharmaceutically acceptable acid addition salt thereof.

4,879,300

NOVEL PIPERIDINE DERIVATIVES

Antonio Giordani, and Vittorio Vecchietti, both of Milan, Italy, assignors to Dr. Lo. Zambeletti S.p.A., Italy

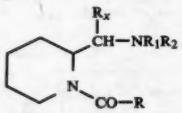
Filed Dec. 21, 1987, Ser. No. 135,839

Claims priority, application United Kingdom, Dec. 22, 1986, 8630639; Aug. 29, 1987, 8720492

Int. Cl.[4] A61K *31/445;* **C07D** *401/06*

U.S. Cl. 514—317 **19 Claims**

1. A compound, or a solvate or salt thereof, of formula I:



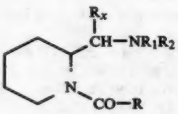
I

in which:

R_1 and R_2 are each hydrogen, alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms or cycloalkylalkyl of 4 to 12 carbon atoms or together form polymethylene of 3 to 6 carbon atoms or alkenylene of 4 carbon atoms, provided that R_1 and R_2 are not simultaneously hydrogen;

Rx is alkyl of 1 to 6 carbon atoms or phenyl, or Rx together with R_1 form a —$(CH_2)_3$— or —$(CH_2)_4$— group; and

R has the formula II



I

in which

n is 0, 1 or 2,

m is 0, 1 or 2,

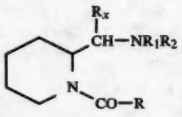
m′ is 0, 1 or 2, provided m+m′ is equal to or less than 2;

X is a direct bond or O, S or NR_5 in which R_5 is hydrogen or alkyl or 1 to 6 carbon atoms,

Ar is phenyl and each of R_3 and $R_3{}^a$ is nitro, cyano, alkoxy of 1 to 6 carbon atoms, alkyl of 1 to 6 carbon atoms, haloalkoxy of 1 to 6 carbon atoms, haloalkyl of 1 to 6 carbon atoms, haloalkenyl of 2 to 6 carbon atoms, haloalkynyl of 2 to 6 carbon atoms, or halogen, or, when m is 2, and m′ is 0 two R_3's form polymethylene of 3 to 6 carbon atoms, or each of R_3 and $R_3{}^1$ is —$COOR_6$, —$CONR_7R_8$, —SO_3R_9, —$SO_2NR_{10}R_{11}$ or —COR_{12}, wherein R_6, R_7, R_8, R_9, R_{10}, R_{11} and R_{12} are independently hydrogen or alkyl of 1 to 6 carbon atoms; and

R_4 is hydrogen or alkyl of 1 to 6 carbon atoms.

14. A method of treating pain in mammals which comprises administering to a mammal in need thereof an analgesically effective amount of a compound of the formula I:

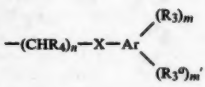


I

or a solvate or a pharmaceutically acceptable salt thereof wherein R_1 and R_2 are each hydrogen, alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms or cycloalkylalkyl of 4 to 12 carbon atoms or together form polymethylene of 6 to 6 carbon atoms or alkenylene of 4 carbon atoms, provided that R_1 and R_2 are not simultaneously hydrogen;

Rx is alkyl of 1 to 6 carbon atoms or phenyl, or Rx together with R_1 form a —$(CH_2)_3$— or —$(CH_2)_4$— group; and

R has the formula II



(II)

in which

n is 0, 1 or 2,

m is 0, 1 or 2,

m′ is 0, 1 or 2, provided m+m′ is equal to or less than 2;

X is a direct bond or O, S or NR_5 in which R_5 is hydrogen or alkyl or 1 to 6 carbon atoms,

Ar is phenyl and each of R_3 and $R_3{}^a$ is nitro, cyano, alkoxy of 1 to 6 carbon atoms, alkyl of 1 to 6 carbon atoms, haloalkoxy of 1 to 6 carbon atoms, haloalkyl of 1 to 6 carbon atoms, haloalkenyl of 2 to 6 carbon atoms, haloalkynyl of 2 to 6 carbon atoms, or halogen, or, when m is 2, and m′ is 0 two R_3's form polymethylene of 3 to 6 carbon atoms, or each of R_3 and $R_3{}^a$ is —$COOR_6$, —$CONR_7R_8$, —SO_3R_9, —$SO_2NR_{10}R_{11}$ or —COR_{12}, wherein R_6, R_7, R_8, R_9, R_{10}, R_{11} and R_{12} are independently hydrogen or alkyl of 1 to 6 carbon atoms; and

R_4 is hydrogen or alkyl of 1 to 6 carbon atoms.

4,879,301

ANTIALLERGIC AND ANTIINFLAMMATORY BENZOTHIAZOLINONE DERIVATIVES

Suminori Umio, Kawanishi; Shizuo Kozasa, Suita, and Takahiro Yabuuchi, Takarazuka, all of Japan, assignors to Hoei Pharmaceutical Co., Ltd., Osaka and Research Institute for Production Developement, Kyoto, both of, Japan

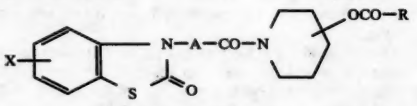
Filed Apr. 26, 1988, Ser. No. 186,439

Claims priority, application Japan, Apr. 28, 1987, 62-106961; Feb. 1, 1988, 63-21754

Int. Cl.[4] A61K *31/445;* **C07D** *417/06*

U.S. Cl. 514—321 **4 Claims**

1. A benzothiazolinone derivative of the formula



in which A is a lower alkylene group, X is a halogen atom, and

R is $-CH_2CH_2COOH$ or $-CH{=}CHCOOH$; or a pharmaceutically acceptable salt thereof.

3. An anti-allergic or anti-inflammatory composition comprising a carrier and an anti-allergic- or anti-inflammatory-effective amount of the benzothiazolinone derivative or salt of claim 1.

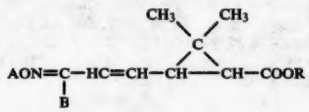
4,879,302

CERTAIN OXIMINO-CYCLOPROPANE CARBOXYLATES HAVING INSECTICIDAL ACTIVITY

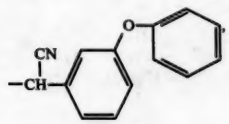
Jean Tessier, Vincennes; Jean-Pierre Demoute, Montreuil-sour-Bois, and Joseph Cadiergue, Aulnay sous Bois, all of France, assignors to Roussel Velaf, Romainville, France

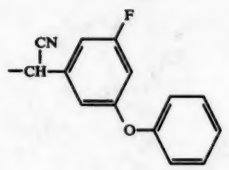
Filed Oct. 29, 1987, Ser. No. 114,534
Claims priority, application France, Oct. 30, 1986, 86-15124
Int. Cl.[4] C07C *69/743, 121/48;* A01N *43/40, 53/00*
U.S. Cl. 514—351 18 Claims

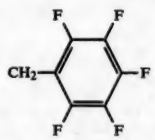
1. All possible stereoisomeric forms and mixtures thereof of a compound of the formula

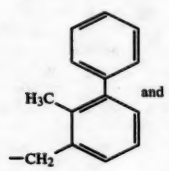


wherein A is selected from the group consisting of hydrogen, alkyl of 1 to 18 carbon atoms and alkenyl of 2 to 18 carbon atoms unsubstituted or substituted with one halogen, B is selected from the group consisting of hydrogen and methyl and R is selected from the group consisting of



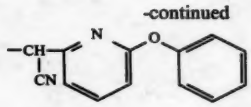






and

-continued



13. A method of combatting insects comprising contacting insects with an insecticidally effective amount of a compound of claim 1.

4,879,303

PHARMACEUTICALLY ACCEPTABLE SALTS

Edward Davison, Margate, and James I. Wells, Canterbury, both of England, assignors to Pfizer Inc., New York, N.Y.

Continuation of Ser. No. 30,658, Mar. 25, 1987, abandoned. This application Oct. 13, 1988, Ser. No. 256,938
Claims priority, application United Kingdom, Apr. 4, 1986, 8608335
Int. Cl.[4] C07D *211/86;* A61K *31/455*
U.S. Cl. 514—356 11 Claims

1. The besylate salt of amlodipine.

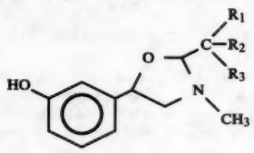
4,879,304

OPHTHALMIC COMPOSITIONS AND PROCESS FOR PREPARING

Ronald D. Schoenwald, Iowa City, Iowa, assignor to Angelini Pharmaceuticals Ltd., River Edge, N.J.

Filed May 1, 1987, Ser. No. 45,913
Int. Cl.[4] A61K *31/42*
U.S. Cl. 514—374 8 Claims

1. An ophthalmic composition comprising polydimethysiloxane with a viscosity of 3–70 centistokes and a therapeutically effective amount of an ophthalmic drug of the formula



II

wherein R_1, R_2 and R_3 are any aliphatic combinations of C_1–C_5, and R_1 may also be hydrogen or the non-toxic pharmaceutically acceptable salts thereof.

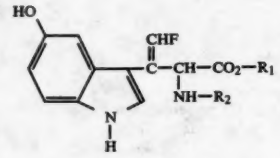
4,879,305

USE OF β-(FLUOROMETHYLENE)-5-HYDROXYTRYPTOPHAN AND DERIVATIVES AS PRODRUGS AND MAO INHIBITION

Ian A. McDonald, Loveland; Michael G. Palfreyman, Cincinnati, both of Ohio, and Jean-Noël Collard, Bischheim, France, assignors to Merrell Dow Pharmaceuticals, Cincinnati, Ohio

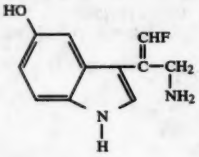
Division of Ser. No. 53,212, May 21, 1987, Pat. No. 4,822,812. This application Dec. 2, 1988, Ser. No. 278,904
Int. Cl.[4] C07D *209/16;* A61K *31/405*
U.S. Cl. 514—419 13 Claims

7. A method for inhibiting monoamine oxidase in the brain which comprises administering to a patient in need thereof an effective amount of a compound of the formula



wherein R_1 is hydrogen or a lower alkyl group and R_2 is hydrogen or a formyl group; or a non-toxic pharmaceutically acceptable salt thereof, in combination with an effective amount of an aromatic L-amino acid decarboxylase (AADC) inhibitor.

10. A compound of the formula:



or a non-toxic pharmaceutically acceptable salt thereof.

4,879,306

COMPOSITION KILLING OR INHIBITING THE GROWTH OF MICROORGANISMS AND THE USE THEREOF

Wolf-Dieter Henkels, Edingen-Neckarh, and Marion Balzer, Neckarbischofsheim, both of Fed. Rep. of Germany, assignors to Grace Service Chemicals GmbH, Heidelberg, Fed. Rep. of Germany

Filed Sep. 27, 1985, Ser. No. 780,784

Claims priority, application Fed. Rep. of Germany, Oct. 9, 1984, 3436989

Int. Cl.[4] A01N *37/34, 43/26*

U.S. Cl. 514—441 **8 Claims**

1. A composition for killing or inhibiting microorganisms in industrial materials or water systems comprising a mixture of 4,5-dichloro-1,2-dithiol-3-one (DDO) and dibromonitrilopropionamide (DBNPA) in amounts effective to provide a synergistic microbicidal activity.

4,879,307

DIOXOLANE ANTIBACTERIAL COMPOSITIONS

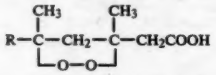
Ashok D. Patil, King of Prussia, Pa., assignor to Harbor Branch Oceanographic Institution, Inc., Ft. Pierce, Fla.

Continuation-in-part of Ser. No. 107,164, Oct. 13, 1987, abandoned, which is a continuation-in-part of Ser. No. 825,061, Feb. 4, 1986, abandoned. This application Aug. 9, 1988, Ser. No. 230,036

Int. Cl.[4] A61K *31/335;* **C07D** *317/04*

U.S. Cl. 514—467 **4 Claims**

1. A compound of the formula:



wherein R is a n-alkyl group $C_{13}H_{27}$, $C_{14}H_{29}$, $C_{15}H_{31}$, $C_{16}H_{33}$, or $C_{17}H_{35}$.

4,879,308

AQUEOUS NITROGLYCERIN INJECTION AND MANUFACTURING PROCESS

Abu S. Alam, Libertyville; Utpal G. Joshi, Hanover Park; Jairaj U. Mehta, Forest Park; Fakrul A. A. Sayeed, Mundelein, and John N. Kapoor, Lake Forest, all of Ill., assignors to LyphoMed, Inc.

Filed Aug. 11, 1987, Ser. No. 84,631

Int. Cl.[4] A61K *31/21*

U.S. Cl. 514—509 **20 Claims**

1. An aqueous solution of nitroglycerin that is sterile, nonpyrogenic, adjustable for tonicity, and suitable for intravenous injection in mammals requiring treatment with nitroglycerin consisting essentially of sterile water for injection, lactose, and nitroglycerin, said nitroglycerin being present at a concentration of at least about 0.5 mg/ml; the solution containing no organic solvents and being stable for at least 1 year.

4,879,309

MERCAPTO-ACYLAMINO ACIDS AS ANTIHYPERTENSIVES

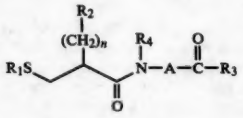
Ronald J. Doll, Maplewood, and Bernard R. Neustadt, West Orange, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 250,035, Sep. 27, 1988, abandoned. This application Jan. 30, 1989, Ser. No. 304,881

Int. Cl.[4] A61K *31/24, 31/195;* **C07C** *149/273*

U.S. Cl. 514—513 **16 Claims**

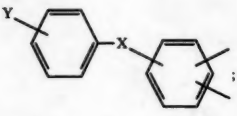
1. A compound having the structural formula



wherein

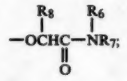
R_1 is H or R_5CO—;

R_2 is Y—C_6H_4—, Y—C_6H_4S—, Y—C_6H_4O—, Y—$C_6H_4CH_2S$—, Y—$C_6H_4CH_2O$—, α-naphthyl, β-naphthyl, β-naphthyl, diphenylmethyl or



;

R_3 is —OR_6, —NR_6R_7 or



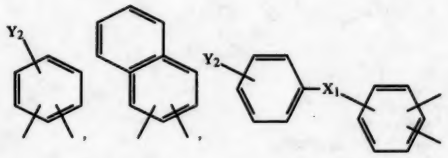
R_4 is hydrogen, lower alkyl or aryl lower alkyl;

R_5 is lower alkyl, hydroxylower alkyl, lower alkoxy lower alkyl; (di-lower alkyl) amino lower alkyl, Y_1—C_6H_4— lower alkyl, lower alkoxy, Y_1—C_6H_4—, naphthyl;

R_6 and R_7 are independently hydrogen, lower alkyl or substituted lower alkyl wherein the substituents are selected from the group consisting of 1 or 2 hydroxy groups, 1 or 2 lower alkoxy groups, lower alkoxy lower alkoxy, halogeno, halogeno lower alkoxy, amino, mono- or di-lower alkylamino, aryl, or substituted aryl wherein the substituents on aryl are 1–3 substituents selected from the group consisting of lower alkyl, hydroxy, halogeno, lower alkoxy and amino;

R_8 is hydrogen, alkyl, carboxyalkyl, mercaptoalkyl, alkylthi-

oalkyl, aminoalkyl, hydroxyalkyl, phenylalkyl, hydroxyphenylalkyl, guanidinoalkyl, or carbamoylalkyl;
n is 0–3;
A is



X and X_1 are independently a bond, —O—, —S—, or —CH_2—;
Y, Y_1 and Y_2 are independently 1 to 3 substituents selected from the group consisting of hydrogen, lower alkyl, cyclolower alkyl, lower alkoxy, OH, F, Cl, Br, I, —CN, —CO_2H, —CO_2—lower alkyl, —CH_2NH_2, —$CONH_2$ and aryl;
wherein aryl means mono-cyclic or fused ring bicyclic aromatic groups having 6 to 10 ring members or a pharmaceutically acceptable acid addition salt thereof.

13. An antihypertensive pharmaceutical composition comprising an antihypertensive effective amount of a compound of claim 1 in a pharmaceutically acceptable carrier.

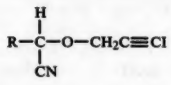
4,879,310

NEW CYANOHYDRIN IODOPROPARGYL ETHERS, PROCESS FOR THEIR PREPARATION AND THEIR USE AS MICROBICIDES

Gerold Schade, Cologne; Wilfried Paulus, and Hans-Georg Schmitt, both of Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed May 3, 1988, Ser. No. 189,580
Claims priority, application Fed. Rep. of Germany, May 19, 1987, 3716682
Int. Cl.[4] C07C *121/30, 121/48;* **A01N** *37/34*
U.S. Cl. 514—519 **3 Claims**

1. A cyanohydrin iodopropargyl ether of the formula



wherein
R is C_2–C_{14}-alkyl, C_2–C_{14}-alkenyl, C_5–C_8-cycloalkyl or -cycloalkenyl or C_2–C_{14}-alkyl, or C_2–C_{14}-alkenyl which is substituted by chlorine or bromine, or C_5–C_8-cycloalkyl and C_5–C_8-cycloalkenyl which is substituted by C_1–C_4-alkyl or chlorine or bromine.

3. A method of combating microorganisms comprising treating a material or adding to a material subject to microbial change or destructive a microbiocidally effective amount of a cyanohydrin iodopropargyl ether according to claim 1.

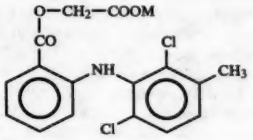
4,879,311

DERIVATIVES OF BENZOYLOXYACETIC ACID, AND PREPARATION AND FORMULATIONS THEREOF FOR THERAPEUTIC USE

Raffaello Giorgi; Marisa Conti, and Giorgio Pifferi, all of Milan, Italy, assignors to Inverni della Beffa S.p.A., Via Ripamonti, Italy

Filed Jul. 21, 1988, Ser. No. 222,552
Claims priority, application United Kingdom, Jul. 29, 1987, 8717997
Int. Cl.[4] A61K *31/24;* **C07C** *101/447*
U.S. Cl. 514—533 **7 Claims**

1. A compound having the general formula:



(I)

wherein M denotes hydrogen or one equivalent of a pharmaceutically acceptable inorganic or organic cation.

4,879,312

METHOD FOR ENHANCING OR PROVOKING ANGIOGENESIS USING ANGIOGENICALLY ACTIVE OMEGA-3 POLYUNSATURATED FATTY ACIDS

Ahmad R. Kamarei, Lexington; Michael Klibaner, Brookline, and Denise Peton, Boston, all of Mass., assignors to Angio Medical Corporation, New York, N.Y.

Filed Mar. 7, 1988, Ser. No. 164,789
Int. Cl.[4] A61K *31/20*
U.S. Cl. 514—560 **8 Claims**

1. Method for provoking or enhancing angiogenesis in a subject in need of enhanced angiogenic activity comprising locally administering to said subject an angiogenically active omega-3 polyunsaturated fatty acid in an angiogenically effective amount.

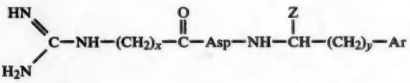
4,879,313

NOVEL PLATELET-AGGREGATION INHIBITORS

Foe S. Tjoeng, Manchester, and Steven P. Adams, St. Charles, both of Mo., assignors to Mosanto Company, St. Louis, Mo.

Filed Jul. 20, 1988, Ser. No. 221,703
Int. Cl.[4] A61K *31/21*
U.S. Cl. 514—616 **10 Claims**

1. A peptide mimetic compound having the following chemical structure:



wherein
x=6 to 10,
y=0 to 4,
Z=H, COOH, $CONH_2$ or C_{1-6}alkyl,
Ar=phenyl, biphenyl or napthyl, each substituted with 1 to 3 methoxy groups, or an unsubstituted phenyl, biphenyl, napthyl, and
Asp=aspartic acid residue.

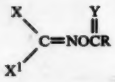
4,879,314

DIHALOFORMALDOXIME

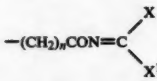
Adam C. Hsu, 1686 Heebner Way, Lansdale, Pa. 19446

Filed Jan. 8, 1986, Ser. No. 817,217
Int. Cl.[4] A61K *31/15*
U.S. Cl. 514—640 **54 Claims**

1. A compound of the formula:



wherein X and X1 are the same or different halo, Y is O or S; R is alkyl, haloalkyl, alkenyl, alkoxycarbonyl, alkoxycarbonylalkyl, aryl, aryloxyalkyl, substituted aryl, and aryloxyalkyl wherein the substituent is selected from one or more halo, lower alkyl, lower alkoxy, halo lower alkyl, nitro, fluosulfonyl lower alkanoyloxy, aralkyl, arylhaloalkyl, aralkenyl, cycloalkyl, cycloalkylalkyl, arylthio, alkythio, haloalkylthio, heterocycle containing from 3 to 5 nuclear carbon atoms and from 1 to 3 heteroatoms or a radical of the formula:



wherein, X, X[1] and Y are as defined above and n is an integer of from 1 to 4.

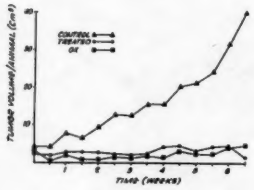
33. A method for controlling bacteria which comprises incorporating into or onto the locus to be treated a fungically effective amount of the compound of claim **1**.

4,879,315

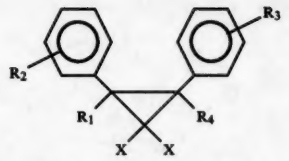
CYCLOPROPYL ANALOGS AS ANTI-ESTROGENIC, ANTI-TUMOR AND FEMALE FERTILITY AGENTS

Robert A. Magarian, and Joseph T. Pento, both of Norman, Okla., assignors to The Board of Regents for the University of Oklahoma, Norman, Okla.

Continuation-in-part of Ser. No. 363,429, Mar. 30, 1982, abandoned, which is a continuation-in-part of Ser. No. 166,255, Jul. 7, 1980, abandoned, which is a continuation-in-part of Ser. No. 128,040, Mar. 7, 1980, abandoned. This application Sep. 21, 1987, Ser. No. 98,945
Int. Cl.[4] A61K *31/03*
U.S. Cl. 514—754 **2 Claims**



1. A method for inducing anti-estrogenic activity in a mammal in need of such activity comprising administering to the mammal an anti-estrogenically effective, non-toxic dosage of the compound having the structure



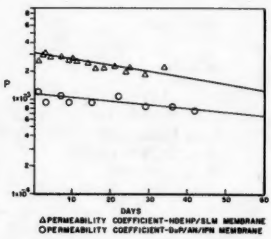
wherein:
X is chlorine;
R_1 is a hydrogen atom;
R_2 is a hydrogen atom;
R_3 is a hydrogen atom;
R_4 is a hydrogen atom; and
the compound is characterized by a cis structure.

4,879,316

INTERPENETRATING POLYMER NETWORK ION EXCHANGE MEMBRANES AND METHOD FOR PREPARING SAME

Spiro D. Alexandratos, Knoxville, Tenn.; Pier R. Danesi, Vienna, Austria, and E. Philip Horwitz, Naperville, Ill., assignors to The University of Tennessee Research Corporation, Knoxville, Tenn.

Filed Feb. 26, 1987, Ser. No. 19,441
Int. Cl.[4] C08D *5/20*
U.S. Cl. 521—27 **8 Claims**



1. An ion exchange membrane for the extraction of ions from aqueous solutions and transport of the ions across the membrane comprising a microporous polymeric support film interpenetrated by an ion exchange polymer to form an interpenetrating polymer being formed from a monomer selected from the class consisting of diundecenyl phosphate and allyl 2-ethylexyl phosphate and comonomers thereof, wherein said polymer includes network, said ion exchange polymer including a main polymer backbone, ion exchange ligands for transporting the ion across the membrane, and ligand support groups branching laterally from said backbone at spaced apart locations along said backbone, said ion exchange ligands being supported on said support groups at positions laterally spaced from said backbone by a sufficient distance such that there is sufficient ligand mobility to provide for transport of the ions between adjacent ligands by flexure of said support groups relative to said backbone, whereby the spacing between said ligand support groups along said main polymer backbone is selected to control the transport of water through the membrane.

4,879,317

METHOD FOR REDUCING SILICONE FOAM DENSITY AND SILICONE FOAM COMPOSITIONS

Kennith A. Smith, Clifton Park, N.Y., and Connie L. Haig, Evansville, Ind., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 235,135, Aug. 23, 1988, abandoned. This application Jan. 24, 1989, Ser. No. 302,105

Int. Cl.[4] C08J 9/02

U.S. Cl. 521—82 6 Claims

1. A foamable composition comprising by weight,

(A) 100 parts of a vinyl-terminated polydiorganosiloxane,

(B) 0.5–50 parts of a hydride polysiloxane consisting essentially of a mixture of 20% to 85% by weight of a substantially linear hydride polysiloxane and 15% to 80% by weight of cyclic hydride polysiloxane,

(C) 0.2–10 parts of a hydroxylated material consisting essentially of a mixture of 0% to 40% by weight of a $C_{(1-8)}$ alkanol and 60% to 100% by weight of water, and

(D) an effective amount of a platinum catalyst.

4,879,318

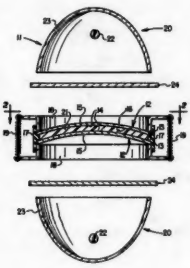
PLASTIC LENS COMPOSITION AND METHOD FOR THE PRODUCTION THEREOF

N. Thornton Lipscomb, and Omar M. Buazza, both of Louisville, Ky., assignors to Ophthalmic Research Group International, Inc., Louisville, Ky.

Continuation-in-part of Ser. No. 21,913, Mar. 4, 1987, abandoned, which is a continuation-in-part of Ser. No. 823,339, Jan. 28, 1986, Pat. No. 4,728,469. This application Nov. 18, 1988, Ser. No. 273,428

Int. Cl.[4] C08F 2/50, 18/24, 220/28, 220/20

U.S. Cl. 522—42 3 Claims



1. A plastic lens composition comprising:

(a) from about 22.0 to about 29.0 percent by weight of bisphenol A diallyl carbonate;

(b) from about 13.0 to about 25.0 percent by weight of 1.6 hexanedioldimethacrylate;

(c) from about 15.0 to about 19.0 percent by weight of trimethylol propane triacrylate;

(d) from about 12.0 to about 18.0 percent by weight of tetraethylene glycol diacrylate;

(e) from about 12.0 to about 19.0 percent by weight of tripropylene glycol diacrylate;

(f) from about 2.0 to about 3.0 percent by weight of styrene;

(g) from about 0.02 to about 0.03 percent by weight of 1-hydroxycyclohexyl phenyl ketone; and

(h) an effective amount of a mold release agent.

4,879,319

ANHYDROUS REFRACTORY PLASTIC

Gustav O. Hughes, Pittsburgh, Pa., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Feb. 24, 1987, Ser. No. 18,356

Int. Cl.[4] C08K 3/34

U.S. Cl. 523—139 6 Claims

1. An anhydrous monolithic refractory plastic consisting essentially of 100 parts by weight of a refractory aggregate, and a bonding and plasticizing agent consisting of; for each 100 parts by weight of said aggregate, about 3 to 10 parts by weight of a powdered novolak resin having a particle size of −60 mesh or finer and about 4 to 15 parts by weight of a glycol solvent.

4,879,320

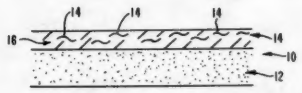
INTUMESCENT FIRE-RETARDANT COATING MATERIAL

Otis H. Hastings, 130 E. Crescent Ave., Mahwah, N.J. 07430

Filed Mar. 15, 1989, Ser. No. 323,806

Int. Cl.[4] C08K 21/14

U.S. Cl. 523—179 46 Claims



1. A fire-retardant coating material, comprising:

a) a fluid intumescent base material having a foaming agent, a blowing agent, a charring agent, a film-forming binder, and a solvent;

b) a refractory fibrous material dispersed in said intumescent material;

c) said refractory fibrous material consisting of aluminum oxide (Al_2O_3) in the range of 40% to 55% by weight, silicon dioxide (SiO_2) in the range of 40% to 55% by weight, and one or more of the compounds selected from the group consisting of ferric oxide (Fe_2O_3), titanium dioxide (TiO_2), potassium oxide (KO_2), sodium oxide (Na_2O), and zirconium oxide (ZrO_2), said compounds being in the range of 0.1% to 5.0% by weight;

d) said refractory fibrous material having at least short fibers with a bulk length of 1/32" to 1";

e) said fire-retardant coating material for coating housing and building frames and the like to render same highly fire resistant.

4,879,321

ARTICLES OF FILLED SYNTHETIC POLYMERIC MATERIALS AND GLASS BEAD FILLER THEREFOR

Pierre Laroche, Nalinnes, Belgium, assignor to Glaverbel, Brussels, Belgium

Division of Ser. No. 041,667, Apr. 20, 1987, Pat. No. 4,761,440, which is a continuation of Ser. No. 754,452, Jul. 11, 1985, abandoned. This application Mar. 30, 1988, Ser. No. 175,287

Claims priority, application United Kingdom, Jul. 12, 1984, 8417740

Int. Cl.[4] C08K 9/00, 9/06

U.S. Cl. 523—203 13 Claims

13. Coated glass beads suitable for use as a filler material for synthetic polymers, said coated glass beads comprising glass beads bearing at least one coating of at least two coating agents, which at least two coating agents comprise at least one silicon-functional silane, and at least one synthetic polymer, which at least one synthetic polymer has either a glass transition temperature (T_g) which is lower than 15° C. or shock-absorbing properties and is selected from the group consisting of polymers and copolymers of butadienes, acrylonitriles, acrylates and aliphiatic urethanes, said coated glass beads

having a total coating amount ranging from 0.02 up to 1% by weight based on the weight of uncoated glass beads.

4,879,322

CONTINUOUS PROCESS FOR THE PRODUCTION OF AQUEOUS POLYURETHANE UREA DISPERSIONS

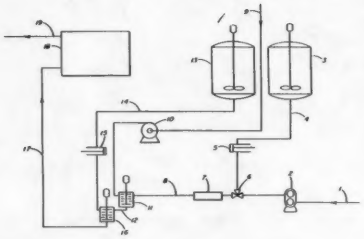
Peter H. Markusch, McMurray, Pa.; Arthur W. Mason, Sistersville, W. Va., and Wolfgang D. Wenzel, Berg-Gladbach, Fed. Rep. of Germany, assignors to Mobay Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 914,908, Oct. 21, 1986, Pat. No. 4,742,095, which is a continuation-in-part of Ser. No. 758,925, Jul. 25, 1985, abandoned. This application May 2, 1988, Ser. No. 188,823

The portion of the term of this patent subsequent to May 3, 2005, has been disclaimed.

Int. Cl.[4] C08G *18/10*

U.S. Cl. 523—322 **10 Claims**



1. A continuous process for the production of an aqueous polyurethane-urea dispersion which comprises

(a) mixing an emulsifiable isocyanate-terminated prepolymer with an aqueous medium in a low shear, stator-rotor dynamic mixer operating at a speed of about 500 to 8000 rpm utilizing a mixing wattage of about 0.3 to 10 watts/cc and a mixing volume of at least about 0.1 liters, the average residence time of the aqueous medium and the prepolymer being about 1 to 30 seconds and the overall flow rate through the dynamic mixer being at least about 50 to 5000 kg/h wherein said mixer has levels of discs arranged in sets of at least one disc which is perpendicular to and attached to the rotor and at least one disc which is perpendicular to the rotor and attached to the stator such that the distance between said levels of discs is about 2 to 50 mm, and

(b) reacting the dispersed isocyanate-terminated prepolymer prepared in (a) with a polyamine chain extender to form an aqueous polyurethane-urea dispersion.

4,879,323

SYNTHETIC ALKALI METAL ALUMINO-SILICATES, METHODS AND USES, COMPOSITIONS AND THEIR METHODS OF PREPARATION

Satish K. Wason, Macon, Ga., assignor to J. M. Huber Corporation, Rumson, N.J.

Division of Ser. No. 116,805, Nov. 3, 1987, Pat. No. 4,812,299, which is a continuation-in-part of Ser. No. 875,120, Jun. 17, 1986. This application Jan. 19, 1989, Ser. No. 298,718

Int. Cl.[4] C08K *3/34, 3/22;* C08J *3/22*

U.S. Cl. 523—351 **11 Claims**

1. A color concentrate composition which comprises a plastic resin and an alkali metal alumino-silicate having a composition in terms of mole ratio of oxides as follows:

$$xM_2O:Al_2O_3:ySiO_2:zH_2O$$

wherein x is the number of moles of alkali metal oxide and is an integer of 0.01 to 2.0, M is an alkali metal, y is the number of moles of SiO_2 associated with the compositions and is an integer of 2.0 to 20.0, and z is the number of moles of bound water and is an integer of 1.0 to 5.0, wherein primary particles of said alkali metal alumino-silicate comprise a core of clay platelets having an integral adjacent area of essentially amorphous alkali metal silicate base-kaolin clay reaction product.

4,879,324

THERMOPLASTIC MOLDING COMPOSITIONS BASED ON POLYCARBONATES, POLYESTERS AND POLYAMIDES

Dietrich Lausberg; Erhard Seiler, both of Ludwigshafen, and Hans-Georg Braun, Gruenstadt-Sausenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 127,035, Nov. 27, 1987, abandoned. This application Feb. 16, 1989, Ser. No. 311,392

Claims priority, application Fed. Rep. of Germany, Nov. 29, 1986, 3640875

Int. Cl.[4] C08L *77/00, 67/00, 63/00*

U.S. Cl. 523—400 **11 Claims**

1. A thermoplastic molding composition containing as essential components

(A) from 1 to 90% by weight of a polycarbonate,

(B) from 1 to 90% by weight of a polyester,

(C) from 1 to 90% by weight of a polyamide,

(D) from 0.5 to 30% by weight of a polymeric component having substantially freely accessible hydroxyl groups, which polymeric component is

(1) a polycondensate of an aliphatic or aromatic diol or polyol with an epihalohydrin,

(2) a polyolefin, polystyrene or rubber elastomer, each having freely accessible hydroxyl groups,

(3) a polymer or copolymer containing a vinylphenylcarbinol,

(4) a polymer or copolymer containing a vinylphenol, or

(5) a phenol-formaldehyde polycondensate, which polymeric component is not identical to component (A), (B) or (C), and in addition

(E) from 0 to 30% by weight of an impact-modifying rubber and

(F) from 0 to 60% by weight of a fibrous or particulate filler.

4,879,325

PAINT COMPOSITION FOR CATION ELECTRODEPOSITION PAINTING

Hitoshi Kimura, Chigasaki; Shigenori Kazama, Yokosuka; Akitoshi Shirasaka, Uruyasu; Kiyoshi Taki, Narashino, and Yukihiro Manabe, Amagasaki, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Shinto Paint Co., Ltd., Amagasaki, both of, Japan

Filed Jul. 31, 1987, Ser. No. 79,970

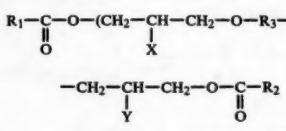
Claims priority, application Japan, Aug. 5, 1986, 61-182825

Int. Cl.[4] C08F *283/10*

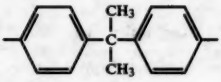
U.S. Cl. 523—404 **25 Claims**

1. A paint composition for cation electrodepositionn painting, comprising:

a first component which is basic unsaturated modified epoxy ester expressed by the general formula:



where R_1 and R_2 are functional groups at least one of which is an α,β-ethylenic double bond containing group, and the remainder is an unsaturated fatty acid chain; R_3 is a group expressed by the formula:



; and X and Y are functional groups whose total number is n+1 in which not less than one functional group is a group containing both a tertiary amine function and a urethane function, and the remainder are hydroxyl groups (—OH); n being an integer ranging from 1 to 20; and

a second component which is a basic unsaturated modified polydiene compound which is a reaction product of (1) a polydiene compound having a molecular weight ranging from 500 to 10,000 and unsaturated double bonds with an iodine value ranging from 50 to 500, and containing oxirane oxygen ranging from 3 to 12% by weight, (2) a secondary amine, and (3) an α,β-ethylenic unsaturated carboxylic acid.

4,879,326

CATIONIC EMULSIONS OF BITUMINOUS BINDERS OF THE TYPE BITUMEN/POLYMER AND CATIONIC EMULSIFYING SYSTEM PREFERABLY UTILIZABLE FOR OBTAINING SAID EMULSIONS

Francis Demangeon, Dardilly, and Emile Lopez, Vienne, both of France, assignors to ELF France, Paris, France

Division of Ser. No. 932,502, Oct. 14, 1986, Pat. No. 4,772,648. This application Jul. 8, 1988, Ser. No. 216,836

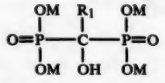
Claims priority, application France, Feb. 15, 1985, 85 02211

The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.

Int. Cl.[4] C08K *5/17, 5/53;* **C08L** *5/00, 95/00*

U.S. Cl. 524—61 **21 Claims**

1. Cationic emulsions of bituminous binders of the bitumen/-polymer type, which are formed from a dispersion of an organic phase comprised of a bitumen/polymer binder in an aqueous phase containing a cationic nitrogen containing emulsifying agent in an amount representing from about 0.03% to 3% by weight of the emulsion and an acid, said acid being present in a quantity such that the cationic emulsifying agent is rendered water-soluble and the pH of said aqueous phase has a value of from about 3 to 9; wherein said aqueous phase contains an adjuvant consisting of at least one water soluble sequestering salt of phosphonic acid in which the sequestration power in respect to the metallic ions is equivalent, in a pH range of from about 3 to about 9, to a fixation of at least 5 mg. calcium ions per gram of salt, said salt having the formula



wherein R_1 is a hydrocarbyl radical of from C_1 to C_{10} and M, which can be identical or different, designates a hydrogen atom or a group M_1; at least one M group is an M_1 group, said M_1 being selected from the group consisting of an alkaline metal atom, $—N^+H_2$ 3—NH_2, and a radical of the formula

wherein the R_2 to R_4 symbols can be identical or different, and each represents one hydrogen atom or a nonvalent hydrocarbyl radical from C_1 to C_8 which can contain one or more functional groups, and wherein two of the radicals R_2 to R_4 can combine to form a heterocyclic group with the nitrogen atom to which they are bonded, the concentration of the adjuvant in the aqueous phase of the emulsion being from about 0.005% to about 0.5% by weight of the emulsion; wherein said emulsion contains by weight from about 30% to about 85% of bitumen/-polymer binder; wherein the cationic emulsifying agent pr®sent in the emulsion is formed by association of one or more emulsifying agents A selected from the group consisting of quaternary ammonimum salts with one or more emulsifying agents B selected among the cationic emulsifying agents having in their molecule, at least three functional groups selected among the group amines and amides in a manner such that at least one of said functional groups is an amine group, and wherein the weight ratio of the total quantity of the compound or compounds A to the total quantity of A and B compounds is from about 5% to about 95%.

4,879,327

NEW PHOSPHOROUS ACID SALTS, COMPOSITIONS CONTAINING THEM, AND THEIR APPLICATION AS FIREPROOFING AGENTS

Pierre Poisson, Bernay; Nadine Rivas, Saint-Ouen du Tilleul, and Pierre Deloy, Levallois Perret, all of France, assignors to Atochem, Paris la Defense, France

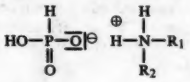
Filed Mar. 31, 1988, Ser. No. 175,822

Claims priority, application France, Mar. 31, 1987, 87 04488

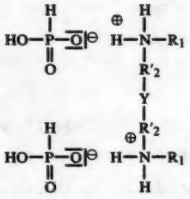
Int. Cl.[4] C08K *5/51;* **C07F** *9/06, 9/65*

U.S. Cl. 524—93 **21 Claims**

1. A phosphorous acid salt of formula (I) or (II):



(I)



(II)

in which:

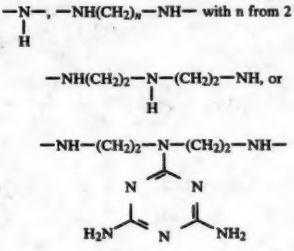
R_1 is a hydrogen atom, an unsubstituted aliphatic hydrocarbon radical containing from 1 to 6 carbon atoms, a cycloaliphatic radical or a phenyl radical, or one of said radicals substituted by at least one halogen atom or amino group;

R_2 is an s-triazine, 1,2,4-triazolyl, benzimidazolyl, heptazine, or 1,3-diazine or is identical to R_1;

R_1 and R_2 together form a divalent group consisting of two said radicals connected by an ≧NH residue, —S—, or a methylene residue, or the two radicals R_1 in (II) together form a divalent radical;

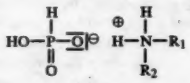
R'_2 is a triazine; and

Y is a group selected from

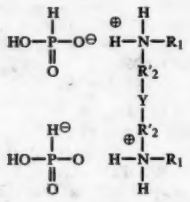


or a single bond.

18. A fireproofed plastic comprising a plastic containing, in an amount sufficient to fireproof said plastic, a phosphorous acid salt of formula (I) or (II):



(I)



(II)

in which:

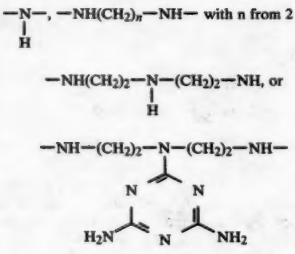
R_1 is a hydrogen atom, an unsubstituted aliphatic hydrocarbon radical containing from 1 to 6 carbon atoms, a cycloaliphatic radical or a phenyl radical or one of said radicals substituted by at least one halogen atom or amino group;

R_2 is a s-triazine, 1,2,4-triazolyl, benzimidazolyl, heptazine, or 1, 3-diazine or is identical to R_1;

R_1 and R_2 together form a divalent group consisting of two said radicals connected by an°NH residue, —S—, or a methylene residue, or the two radicals R_1 in (II) together form a divalent radical;

R'_2 is a triazine; and

Y is a group selected from



or a single bond.

4,879,328

AROMATIC POLYESTER COMPOSITION AND PROCESS FOR PRODUCING THE SAME

Hiroo Karasawa; Kiichi Kometani, and Kiyomi Okita, all of Nagoya, Japan, assignors to Toray Industries, Tokyo, Japan

Filed May 13, 1988, Ser. No. 193,951

Claims priority, application Japan, May 18, 1987, 62-119057; Jul. 10, 1987, 62-173438; Jul. 10, 1987, 62-173439

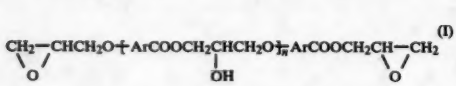
Int. Cl.[4] C08K *5/15*; C08L *67/04*

U.S. Cl. 524—109 **31 Claims**

1. A polyester composition comprising:

(a) 100 parts by weight of an aromatic polyester;

(b) 0.005–10 parts by weight of an epoxy compound of the formula (I):



(I)

(wherein Ar means C_6–C_{20} aromatic group or C_6–C_{20} alicyclic group, n means an integer of 0–20); and

(c) 1–70 parts by weight of at least one elastomer which has at least one functional group selected from the group consisting of epoxy groups, carboxyl group, carboxylate ester groups, carboxylic acid amide groups, acid anhydride group, imide groups, carboxylate salt groups, hydroxyl group, amino group and cyano group, the elastomer having a tensile modulus of 1–6,000 kg/cm$_2$.

4,879,329

IMPACT RESISTANT FLAME-RETARDANT RESIN COMPOSITION

Masafumi Hongo, Hatsukaichi, and Mitsuaki Noda, Ohtake, both of Japan, assignors to Mitsubishi Rayon Company Ltd., Tokyo, Japan

Filed Oct. 18, 1988, Ser. No. 259,536

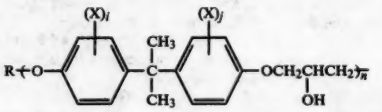
Int. Cl.[4] C08K *5/13, 5/06*

U.S. Cl. 524—114 **7 Claims**

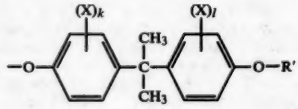
1. An impact resistant flame-retardand resin composition comprising:

100 parts by weight of a polymer mixture comprising a polycarbonate resin (A), a rubber-reinforced vinyl copolymer (B) and, optionally, a vinyl polymer (C);

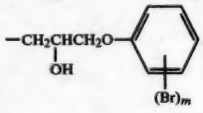
from 3 to 50 parts by weight of a high molecular weight halogenated compound of the following formula I having a halogen content of at least 10% by weight:



(I)



wherein n is an average polymerization degree of from 35 to 100, each X independently represents hydrogen, chlorine or bromine, each of i, j, k and l is an integer of from 1 to 4, and each of R and R' independently is hydrogen, a methyl group, an epoxypropyl group, a phenyl group or



wherein m is 0, 1, 2 or 3; and from 2 to 30 parts by weight of an antimony compound.

4,879,330

POLYMER MIXTURE COMPRISING A POLYPHENYLENE ETHER, A BLOCK COPOLYMER, A PHOSPHATE ESTER AND ADDITIVES

Johannes W. J. De Munck, Huybergen, and Johannes H. G. M. Lohmeijer, Hoogerheide, both of Netherlands, assignors to General Electric Company, Selkirk, N.Y.

Filed Mar. 17, 1987, Ser. No. 26,593

Claims priority, application Netherlands, Mar. 17, 1986, 8600670

Int. Cl.[4] C08K *5/51*; C08L *7/04*

U.S. Cl. 524—151 **14 Claims**

1. A flexible polymer mixture which comprises the following constiutents:

30–40% by weight of polyphenylene ether;
30–40% by weight of block copolymer copolymer;
20–35% by weight of phosphate ester,
the sum of the said constituents being 100% by weight, wherein the mixture does not comprise a crosslinking agent.

4,879,331

SELF-LUBRICATING THERMOPLASTIC RESIN WEAR PART

Toshihiko Endo, and Nobuyuki Matsunaga, both of Fuji, Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

Filed May 24, 1988, Ser. No. 197,873
Claims priority, application Japan, May 29, 1987, 62-134177
Int. Cl.[4] C08K *5/54*
U.S. Cl. 524—267 **3 Claims**

1. A self-lubricating wear part having improved anti-friction and anti-frictional noise characteristics formed of a thermoplastic resin composition which consists essentially of (i) between 99.9 to 60 parts by weight of a thermoplastic polyester or polyacetal resin, (ii) between 0.05 to 20 parts by weight of a silicone oil having a viscosity of 150,000 cSt or more, and (iii) between 0.05 to 20 parts by weight of a lubricating oil having a viscosity of 3,000 cSt or less.

4,879,332

HALOGEN-FREE FLAME RESISTING SYNTHETIC RESIN COMPOSITION

Nobuo Saito, and Mitsuo Noda, both of Chiba, Japan, assignors to Dainichiseika Color & Chemicals Mfg. Co. Ltd., Tokyo, Japan

PCT No. PCT/JP87/00593, § 371 Date Apr. 5, 1988, § 102(e) Date Apr. 5, 1988, PCT Pub. No. WO88/00959, PCT Pub. Date Feb. 11, 1988
PCT Filed Aug. 7, 1987, Ser. No. 183,760
Claims priority, application Japan, Aug. 9, 1986, 61-187472
Int. Cl.[4] C08K *3/22*; C08L *101/00*; C09K *21/02*
U.S. Cl. 524—436 **12 Claims**

1. A self-extinguishing, halogen-free flame retardant composition comprising 70 to 30 parts by weight of at least one thermoplastic synthetic resin, 30–70 parts by weight of magnesium hydroxide having an average particle size of 0.1 to 10 μm, and 0.5–15 parts by weight of a synthetic silicate which is a non-crystalline silica having an amorphous steric chain of Si-O-Si-O in its structure.

4,879,333

AQUEOUS PRESSURE SENSITIVE ADHESIVE COMPOSITIONS

Glenn R. Frazee, Kenosha, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

Continuation-in-part of Ser. No. 302,050, Jan. 25, 1989, abandoned, which is a continuation-in-part of Ser. No. 125,313, Nov. 25, 1987, abandoned, which is a continuation of Ser. No. 905,593, Sep. 9, 1986, abandoned. This application Feb. 24, 1989, Ser. No. 316,268
Int. Cl.[4] C08F *2/16*; C08K *3/20*
U.S. Cl. 524—460 **37 Claims**

1. A method for preparing a reaction mixture which contains an aqueous pressure-sensitive adhesive composition, utilizing an emulsion-polymerization reaction, wherein emulsion particles form upon initiation of the emulsion-polymerization reaction, the method comprising the steps of:

combining, in a reactor, initial-feed ingredients comprising water and an emulsion-polymerization surfactant;

agitating the reactor contents and subjecting the reactor contents to an inert atmosphere;

heating the agitated reactor contents to a predetermined reaction temperature;

adding into the agitated reactor monomer-feed ingredients comprising an emulsion-polymerizable monomer mixture and an effective amount of an initiator for initiating the emulsion-polymerization reaction, wherein either the initial-feed ingredients or the monomer-feed ingredients further comprise an effective amount of a stabilizer for preventing coagulation of the emulsion particles; and

adding to the agitated reactor, prior to completion of the emulsion-polymerization reaction, an effective amount of a polymeric resin, soluble or dispersible in water or in alkali, and having a number average molecular weight of about 1,000 to about 20,000, for producing in the reactor a reaction mixture containing an aqueous pressure-sensitive adhesive composition having an adhesive value of at least 6.6 ounces per linear inch.

4,879,334

ORGANOPOLYARYLSILANES, PROCESS FOR MANUFACTURING THE SAME AND FIBERS COMPRISING THE SAME

Yoshio Hasegawa, Higashi, and Kiyohito Okamura, Mito, both of Japan, assignors to The Foundation: The Research Institute for Special Inorganic Materials, Ibaraki, Japan

PCT No. PCT/JP87/00147, § 371 Date Nov. 6, 1987, § 102(e) Date Nov. 6, 1987, PCT Pub. No. WO87/05612, PCT Pub. Date Sep. 24, 1987
PCT Filed Mar. 10, 1987, Ser. No. 131,139
Claims priority, application Japan, Mar. 11, 1986, 61-51397; Mar. 11, 1986, 61-51398
Int. Cl.[4] C08F *283/00*
U.S. Cl. 525—474 **23 Claims**

1. An organopolyaromaticsilane which is characterized in that aromatic ring segments derived from a pitch that is soluble in an organic solvent and having a skeleton mainly comprising an aromatic condensed ring structure and organosilane segments having a skeleton mainly comprising carbosilane and polysilane structures are randomly bonded to each other with a silicon-carbon linkage intervening therebetween and further characterized by being soluble in an organic solvent

wherein the polysilane is a linear, cyclic or ramified polymer having a main chain structure represented by the general formula,

wherein n is an integer not smaller than 2, and R_1 and R_2 which are the same or different, are hydrogen, halogen, alkyl having up to 6 carbon atoms or aryl having up to 12 carbon atoms, respectively.

4,879,335

BLACK LIQUID COLORANT AND POLYESTER FIBERS DOPE-DYED THEREWITH

Fumio Hirota, Tokyo; Tsutomu Kado, Kawagoe; Shosuke Oku, and Noboru Watanabe, both of Sabae, all of Japan, assignors to Toyo Ink Mfg. Co., Ltd., Tokyo and Nippon Ester Company Ltd., Okazaki City, both of, Japan

Filed Sep. 22, 1987, Ser. No. 99,534
Claims priority, application Japan, Sep. 30, 1986, 61-229775
Int. Cl.[4] C08K *9/02*; C08L *67/02*
U.S. Cl. 524—495 **8 Claims**

1. Black dope-dyed polyester fibers which comprise a polyester blended with a black liquid colorant comprising 5–50 weight % of oxidation-neutralization-treated carbon black obtained by subjecting a gas phase oxidized carbon black to a wet oxidation treatment with a peroxide and a subsequent neutralization with an alkali, and 95–50 weight % of liquid dispersion medium.

4,879,336

NOVEL COATING SLIPS

Bernd Schilling, Burghausen, and Karl-Ernst Fickert, Emmerting, both of Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Fed. Rep. of Germany

Continuation of Ser. No. 55,199, May 28, 1987, abandoned. This application Nov. 17, 1988, Ser. No. 272,634

Claims priority, application Fed. Rep. of Germany, Jul. 8, 1986, 3622820

Int. Cl.[4] C08L *29/04*

U.S. Cl. 524—503 6 Claims

1. In a coating slip for coating flat surfaces comprising an aqueous dispersion, with a solids content of 8 to 65% by weight, of 100 parts by weight of a pigment, 3 to 30 parts by weight of synthetic high-molecular-weight binder based on copolymers of acrylates, styrene, butadiene and unsaturated carboxylic acid esters and 0.5 to 2 parts by weight of a cobinder, the improvement comprising using a cobinder polymer containing a large degree of hydroxyl groups comprising (a) 50 to 95% by weight of vinyl alcohol units, (b) 5 to 50% by weight of 1-alkylvinyl alcohol units to 1 to 4 alkyl carbon atoms, (c) 0 to 20% by weight of vinyl acylate units, (d) 0 to 20% by weight of allyl alcohol units and (e) 0 to 5% by weight of other polymerizable monomers.

4,879,337

POLYOL RESIN COATING COMPOSITION CONTAINING NON-AQUEOUS POLYMER DISPERSION AND ALIPHATIC SULFONIC ACID COMPOUND

Kishio Shibato, Kamakura, and Masataka Kawamura, Fujisawa, both of Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan

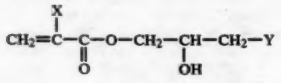
Filed Nov. 2, 1987, Ser. No. 115,868

Claims priority, application Japan, Nov. 11, 1986, 61-266650; May 14, 1987, 62-117797; Sep. 1, 1987, 62-216285

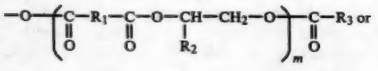
Int. Cl.[4] C08F *265/04;* C08L *51/08, 61/28*

U.S. Cl. 524—504 4 Claims

1. A higher solid coating composition, comprising 100 parts by weight of a solid resin mixture comprising 30 to 90 parts by weight of a polyol resin and 10 to 70 parts by weight of an alkyletherified melamine resin, 0.2 to 10 parts by weight as an aliphatic sulfonic acid of an aliphatic sulfonic acid compound having a carbon number of 4 to 22, and 1 to 100 parts by weight as a polymer solid content of a non-aqueous polymer dispersion, said non-aqueous polymer dispersion consisting essentially of (a) 40 to 80% by weight of an organic solvent component, (b) 10 to 505 by weight of particle component insoluble in said component (a), and (c) 5 to 40% by weight of a dispersion stabilizer component soluble in said component (a) and capable of stably dispersing said component (b) into said component (a), said dispersion stabilizer component comprising a product obtained by polymerizing 20 to 100% by weight of a vinyl type monomer containing a polyester chain group represented by the following formula with 0 to 80% by weight of a second vinyl type monomer:



wherein X is a hydrogen atom or a methyl group, Y is



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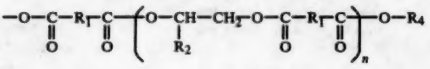
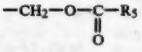


m and n are from 1 to 10, R_1 is a residue of acid anhydride having a carbon number of 2 to 6, R_2 is a phenyl group, an alkyl or aromatic group having a carbon number of 5 to 19,



group (R_5 is an alkyl or aromatic group having a carbon number of 3 to 17, or —CH_2—O—R_6 group (R_6 is an alkyl or aromatic group having a carbon number of 4 to 18, R_3 is an alkyl group or a residue of aromatic monocarboxylic acid having a carbon number of 1 to 20, and R_4 is a residue of saturated aliphatic, alicyclic or aromatic monovalent alcohol having a carbon number of 1 to 18.

4,879,338

POLY(ARYL ETHER KETONE) COMPOSITIONS

Frank W. Mercer, Belmont; Michael F. Froix, Los Altos, and Tai C. Cheng, Mountain View, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Feb. 13, 1985, Ser. No. 701,279

Int. Cl.[4] C08L *71/04*

U.S. Cl. 524—508 6 Claims

1. A composition comprising a blend of a poly(aryl ether ketone) and from about 1% to about 50% of poly(2,6-dimethyl-p-phenylene oxide).

4,879,339

STORAGE STABLE AND ROOM TEMPERATURE-CURABLE ORGANOPOLYSILOXANE COMPOSITION

Masachika Yoshino, Annaka, Japan; Nobuyuki Hasebe, Rancho Palos Verdes, Calif.; Hironao Fujiki, and Hiroshi Inomata, both of Takasaki, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Mar. 3, 1988, Ser. No. 163,434

Claims priority, application Japan, Mar. 4, 1987, 62-49184

Int. Cl.[4] C08L *5/13, 83/04*

U.S. Cl. 524—740 7 Claims

1. A room temperature-curable storage stable organopolysiloxane composition which comprises, in admixture:

(A) 100 parts by weight of an organopolysiloxane having a viscosity of at least 50 centipoise at 25° C. and at least two vinyl groups bonded to the silicon atoms in a molecule;

(B) an organohydrogenpolysiloxane having at least three hydrogen atoms directly bonded to the silicon atoms in a molecule in an amount sufficient to provide from 0.5 to 4.0 moles of the silicon-bonded hydrogen atoms per mole of the vinyl groups bonded to the silicon atoms in the component (A);

(C) a catalytic amount of a platinum compound;

(D) from 20 to 600 parts by weight of an inorganic filler;

(E) from 5 to 80 parts by weight of an aliphatic hydrocarbon compound which is liquid or semi-solid at room temperature; and

(F) a compound selected from the group consisting of erythrobic acid, sodium erythorbate, 2,6-ditert-butyl p-cresol, tocopherol, butyl hydroxy anisole and propyl gallate, in an amount of at least 10 ppm by weight based on the aliphatic hydrocarbon compound as the component (E).

4,879,340

ADSORBENT COMPOSED OF POROUS BEADS OF CHITOSAN AND ADSORPTION METHOD USING SAME

Soyao Moriguchi; Hiroshi Suzuki, both of Yokohama; Hiroko Watanabe, Meguro; Motoaki Satoh, Yokosuka; Michio Abe, Sagamihara, and Yasuo Iwata, Ota, all of Japan, assignors to Showa Denko Kabushiki Kaisha and Kawasumi Kagaku Kougiyou Kabushiki Kaisha, both of Tokyo, Japan

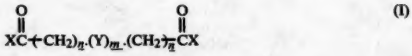
Filed Aug. 19, 1987, Ser. No. 86,989

Claims priority, application Japan, Aug. 19, 1986, 61-192141; Aug. 19, 1986, 61-192142; Aug. 19, 1986, 61-192143; Aug. 19, 1986, 61-192144; Feb. 18, 1987, 62-33472

Int. Cl.[4] C08F *283/00;* B01J *1/04;* C08B *37/08*

U.S. Cl. 525—54.2 22 Claims

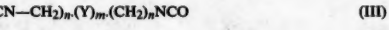
1. An adsorbent composed of porous beads of crosslinked chitosan constituted of glucosamine, having protein A or a lectin covalently bonded to said porous beads of crosslinked chitosan, wherein said crosslinked chitosan is obtained by crosslinking uncrosslinked chitosan with a crosslinking agent selected from the group consisting of dicarboxylic acids and halides thereof represented by formula (I):



(I)

wherein X represents a chlorine or bromine atom or a hydroxyl group; Y represents a cyclohexylene, phenylene, methylphenylene or dimethylphenylene group; m is 0 or 1, and n is 0 or an integer of from 1 to 7;

and diisocyanates represented by formula (III);



(III)

wherein Y, m and n are as defined above;

said protein A or lectin being covalently bonded via a bonding group to at least a part of the amino groups of the glucosamine constituting said chitosan and at least a part of the amino groups of said crosslinking agent of the formula (III) when present, said bonding group comprising a combination group having a carboxyl group introduced by reaction of said amino groups with an alkanedicarboxylic anhydride having from 4 to 16 carbon atoms; provided that

substantially all of the amino groups other than the amino groups to which said protein A or lectin is covalently bonded via the combination group are acylated with an acyl group having from 2 to 6 carbon atoms.

4,879,341

POLYESTER/POLYAMIDE RESIN COMPOSITIONS CONTAINING GRAFTED POLYOLEFIN AND MOLDED PRODUCTS THEREOF

Tatsuo Tsumiyama; Toshiro Shimada; Yoshifumi Akagawa; Satoru Nakamoto, and Teruo Takada, all of Ube, Japan, assignors to Ube Industries, Ltd., Ube, Japan

Filed May 26, 1988, Ser. No. 199,337

Claims priority, application Japan, Jun. 3, 1987, 62-138180; Aug. 27, 1987, 62-211389; Feb. 12, 1988, 63-28746

Int. Cl.[4] C08L *77/00*

U.S. Cl. 525—66 16 Claims

1. A resin composition comprising:

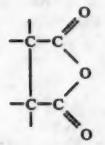
100 parts by weight of a mixture comprising (a) from 5 to 95% by weight of polyamide and (b) from 95 to 5% by weight of a thermoplastic polyester; and

(c) from 0.5 part to 40 parts by weight of a grafted polyolefin modified product formed by graft polymerization of an addition polymer having a peroxy bond in its molecular chain to a modified polyolefin having a functional group in its molecular chain;

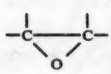
said modified polyolefin is a polymer formed by introducing a monomer having at least one kind of functional group selected from the group consisting of a carboxylic acid group, a carboxylic acid metal salt group, a carboxylic acid exter group, an acid anhydride group, an epoxy group, an acid amide group and an imide group, represented by Formula (I) to (VI) shown below, into a polyolefin obtained using as main monomer components, ethylene and an alpha-olefin or diene having 3 to 20 carbon atoms, and wherein Formula (I) to (VI) are

(I)

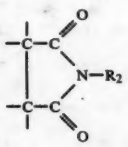
(II)



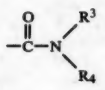
(III)



(IV)



(V)



(VI)

wherein R_1 to R_4 each represent a hydrogen atom or an aliphatic, alicyclic or aromatic residual group having 1 to 30 carbon atoms and M represents a mono- to trivalent metal.

4,879,342

THERMOPLASTIC POLYCARBONATE MOULDING COMPOSITIONS

Hans-Jürgen Kress; Winfried Paul, both of Pittsburgh, Pa.; Horst Peters, Leverkusen, Fed. Rep. of Germany; Christian Lindner, Cologne, Fed. Rep. of Germany, and Josef Buekers, Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 933,249, Nov. 21, 1986, Pat. No.

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1985, 3542678; European Pat. Off., Nov. 20, 1986, 86116070.3; Japan, Nov. 27, 1986, 61-280917

The portion of the term of this patent subsequent to Oct. 11, 2005, has been disclaimed.

Int. Cl.[4] C08L *69/00, 83/10*

U.S. Cl. 525—67 11 Claims

1. A thermoplastic moulding composition containing

(A) 55 to 95 parts by weight, relative to 100 parts by weight of A+B, of polydiorganosiloxanepolycarbonate block copolymer having an average molecular weight $\overline{M}_w$ of 10,000–200,000 and having a content of aromatic carbonate structure units between 75% by weight and 99% by weight and a content of diorganosiloxy units between 25% and 1.0% by weight, the block copolymers being prepared, starting from polydiorganosiloxanes containing

α,ω-bishydroxyaryloxy end groups, with a degree of polymerization $\overline{P}_n$ of 5 to 100,

(B) 5 to 45 parts by weight, relative to 100 parts by weight of A+B, of a random copolymer of 95–70% by weight of styrene, α-methylstyrene or ring-substituted styrenes or mixtures of said vinyl aromatics and 5–30% by weight of maleic anhydride, and

(C) 1 to 4.5 parts by weight, relative to 100 parts by weight of A+B, of one or more graft polymers of

(C 1) 5 to 90 parts by weight of a mixture of

(i) 50 to 95% by weight of styrene, α-methylstyrene, ring-substituted styrene, methacrylate or mixtures thereof and

(ii) 50 to 5% by weight of (meth)acrylonitrile, methyl methacrylate, maleic anhydride, N-substituted maleimide or mixtures thereof, on

(C 2) 95 to 10 parts by weight, or a rubber having a glass transition temperature ≦10° C.

4,879,343

HEAT AND IMPACT RESISTANT RESIN COMPOSITION

Yuji Aoki, Yokkaichi, and Hiroaki Miyazaki, Suzuka, both of Japan, assignors to Mitsubishi Monsanto Chemical Company, Tokyo, Japan

PCT No. PCT/JP87/00931, § 371 Date Aug. 5, 1988, § 102(e) Date Aug. 5, 1988, PCT Pub. No. WO88/04309, PCT Pub. Date Jun. 16, 1988

PCT Filed Dec. 1, 1987, Ser. No. 243,338

Claims priority, application Japan, Dec. 11, 1986, 61-295592; Feb. 19, 1987, 62-36574

Int. Cl.[4] C08L *51/04, 55/02, 79/08*

U.S. Cl. 525—71 **12 Claims**

1. A heat and impact resistant resin composition which comprises:

(i) from 5 to 89 parts by weight of a graft copolymer resin (A) obtained by graft polymerizing from 30 to 75 parts by weight of a monomer mixture comprising from 30 to 80% by weight of an aromatic vinyl monomer, from 10 to 50% by weight of an N-substituted maleimide monomer, from 10 to 40% by weight of a vinyl cyanide monomer and from 0 to 30% by weight of another vinyl monomer copolymerizable with these monomers, provided that the total amount of the monomer mixture is 100% by weight, onto from 25 to 70 parts by weight of a conjugated diene rubber (a) which is a rubbery polymer containing at least 50% by weight of a conjugated diene monomer component and having a glass transition temperature of not higher than 0° C.;

wherein said conjugated diene rubber (a) has an average particle size within a range of from 0.1 to 0.5 μm in its latex form as dispersed in water;

wherein said N-substituted maleimide monomer is at least one monomer selected from the group consisting of maleimide, N-phenylmaleimide, N-(o-methylphenyl)maleimide, N-(m-methylphenyl)maleimide, N-(p-methylphenyl)maleimide and N-cyclohexylmaleimide;

(ii) from 10 to 90 parts by weight of a copolymer resin (B) obtained by polymerizing a monomer mixture comprising from 30 to 80% by weight of an aromatic vinyl monomer, from 10 to 50% by weight of an N-substituted maleimide monomer, from 10 to 40% by weight of a vinyl cyanide monomer and from 0 to 30% by weight of other vinyl monomer copolymerizable with these monomers, provided that the total amount of the monomer mixture is 100% by weight, or an imido group-containing copolymer resin (B') obtained by reacting a primary amine or ammonia, or both, with a copolymer obtained by polymerizing a monomer mixture comprising from 30 to 80% by weight of an aromatic vinyl monomer, from 5 to 50% by weight of maleic anhydride and from 0 to 40% by weight of another vinyl monomer copolymerizable with these monomers, provided that the total amount of the monomer mixture is 100% by weight;

(iii) from 1 to 45 parts by weight of a graft copolymer resin (C) obtained by graft polymerizing from 83 to 98 parts by weight of a monomer mixture comprising from 55 to 85% by weight of an aromatic vinyl monomer and from 15 to 45% by weight of a vinyl cyanide monomer, provided that the total amount of the monomer mixture is 100% by weight, onto from 2 to 17 parts by weight of a conjugated diene rubber (c), wherein said conjugated diene rubber (c) is a rubbery polymer containing at least 50% by weight of a conjugated diene monomer component, having a glass transition temperature of not higher than 0° C., and an average particle size of more than 0.5 μm and not more than 5 μm; and

(iv) from 0 to 50 parts by weight of a copolymer resin (D) obtained by polymerizing a monomer mixture comprising from 55 to 85% by weight of an aromatic vinyl monomer and from 15 to 45% by weight of a vinyl cyanide monomer, provided that the total amount of the monomer mixture is 100% by weight, and also

provided that the total amount of the copolymer resins (A), (B) or (B,), (C) and (D) is 100 parts by weight, wherein the weight ratio of the conjugated diene rubber (a) for the graft copolymer resin (A) to the conjugated diene rubber (c) for the graft copolymer resin (C) is within a range of conjugated diene rubber (a)/conjugated diene rubber (c)=97/3 to 50/50, and wherein the total amount of the conjugated diene rubber (a) and the conjugated diene rubber (c) contained in the resin composition is within a range of 5 to 40% by weight relative to the entire resin composition.

4,879,344

ACRYLIC/SILICONE RESINS FOR POWDER COATINGS

James T. K. Woo, Medina; John C. Reising, Avon; Richard M. Marcinko, North Royalton, all of Ohio, and David E. Miles, Port Huron, Mich., assignors to The Glidden Company, Cleveland, Ohio

Filed Aug. 8, 1988, Ser. No. 229,269

Int. Cl.[4] C08F *8/00*

U.S. Cl. 525—100 **6 Claims**

1. A powder paint coating composition containing a thermosetting polymeric binder obtained by blending and extruding components comprising by weight:

50% to 75% of a low molecular weight hydroxyl functional acrylic copolymer having a Tg above about 40° C., the copolymer comprising copolymerized ethylenically unsaturated monomers between 50% and 73% acrylic monomer, between 7% and 30% hydroxyl functional monomer, with the balance being other ethylenically unsaturated monomer; and

25% to 50% of a solid cyclic silicone resin have a Tg above about 40° C., said silicone resin having at least two hydroxyl groups per silicone molecule and a number average molecular weight between about 600 and 8,000.

4,879,345

FLUOROPOLYMER BASED COATING COMPOSITION FOR ADHESION DIRECT TO GLASS

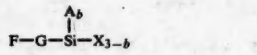
Bruce A. Connelly, Gibsonia; Matthew E. Wehrle, New Kensington, and Paul P. Greigger, Allison Park, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jul. 27, 1988, Ser. No. 224,837

Int. Cl.[4] C08F *8/00*

U.S. Cl. 525—104 **30 Claims**

1. A coating composition, comprising a fluoropolymer, a film forming adjuvant resin which is different from the fluoropolymer and adapted to react with the group represented by F in the functional organosilane of formula I and which is selected from the group consisting of acrylic resins, polypoxide resins, polyester resins, aminoplast resins and mixtures thereof; and an amount effective to promote adhesion of a functional organosilane represented by formula I:



(I)

wherein

A represents an organo group containing from 1 to 18 carbon atoms,

G represents an organo group containing from 2 to 10 carbon atoms,

X represents a hydrolyzable group,

b is an integer from 0 to 2, and

F represents amino, polyamino, epoxy, glycidoxy, mercapto, cyano, allyl, vinyl, urethano, halo, isocyanato, ureido, imidazolinyl, acrylato or methacrylato.

4,879,346

BLENDS OF A SILICONE-POLYCARBONATE BLOCK COPOLYMER WITH A COMPATIBILIZED ALLOY OF POLYPHENYLENE ETHER RESIN/POLYESTER RESIN

Richard C. Bopp, West Coxsackie, and John B. Yates, III, Glenmont, both of N.Y., assignors to General Electric Company, Selkirk, N.Y.

Filed Jun. 10, 1988, Ser. No. 205,264

Int. Cl.[4] C08F *8/00*

U.S. Cl. 525—146 **19 Claims**

1. A thermoplastic composition comprising: (a) silicone-polycarbonate copolymer; and (b) an admixture comprised of polyphenylene ether resin, polyester resin and aromatic polycarbonate resin.

4,879,347

GRAFT POLYMERIZATION PREFORMER AND METHOD OF MANUFACTURING THE SAME

Yasuo Moriya; Nobuyoshi Suzuki, and Hiroshi Goto, all of Aichi, Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan

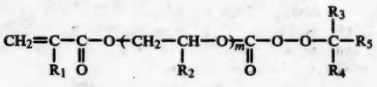
Division of Ser. No. 149,746, Jan. 29, 1988. This application Apr. 14, 1989, Ser. No. 339,057

Claims priority, application Japan, Jan. 31, 1987, 62-21127; May 11, 1987, 62-114021; Aug. 10, 1987, 62-199612; Aug. 10, 1987, 62-199615; Aug. 10, 1987, 62-199618

Int. Cl.[4] C08F *255/02, 255/04, 255/06, 255/08*

U.S. Cl. 525—263 **13 Claims**

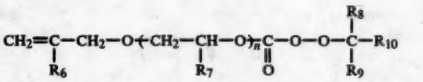
1. A method of manufacturing a graft polymerization preformer comprising the steps of suspending (a) 100 parts by weight of ethylene homopolymer, copolymer or mixture thereof in (b) water, adding to the resultant suspension a solution obtained by dissolving in (c) 5 to 400 parts by weight of one or more vinyl monomers selected from the group consisting of vinyl aromatic monomers, acrylic or methacrylic ester monomers and mixtures thereof, acrylonitrile, methacrylonitrile and vinyl ester monomers, (d) from 0.1 to 10 parts by weight, with respect to 100 parts by weight of said vinyl monomer, of one or more radical polymerizable organic peroxides represented by the formula



(I)

where R_1 represents a hydrogen atom or an alkyl group with a carbon number of 1 to 2, R_2 a hydrogen atom or a methyl group, R_3 and R_4 respective alkyl groups with carbon numbers of 1 to 4, R_5 an alkyl, phenyl or alkyl-substituted phenyl group with a carbon number of 1 to 12 or a cycloalkyl group with a carbon number of 3 to 12, and m is 1 or 2,

or the formula



(II)

where R_6 represents a hydrogen atom or alkyl group with a carbon number of 1 to 4, R_7 a hydrogen atom or a methyl group, R_8 and R_9 represents alkyl groups with carbon numbers of 1 to 4, R_{10} and alkyl, phenyl or alkyl-substituted phenyl group with carbon number of 1 to 12 or cycloalkyl group with carbon number of 3 to 12, and n being 0, 1 or 2,

and (e) radical polymerization initiator with a decomposition temperature of 40° to 90° C. for a half reduction period of 10 hours such that it constitutes 0.01 to 5 parts by weight per 100 parts by weight of the sum of said vinyl monomer(s) and said radical polymerizable organic peroxide, heating the resultant mixture under a condition that decomposition of said initiator does not substantially take place whereby to impregnate said ethylene polymer with said vinyl monomer(s), radical polymerizable organic peroxide and radical polymerization initiator, and when the content of free vinyl monomer(s), radical polymerizable organic peroxide and radical initiator is reduced to be 50% by weight or less of the initial value, elevating the temperature of said water suspension to cause copolymerization of said vinyl monomer(s) and said radical polymerizable organic peroxide in said ethylene polymer.

4,879,348

CROSSLINKED AND GRAFTED OVERPOLYMER ACRYLATE RUBBERS

David E. Henton, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 915,466, Oct. 6, 1986, abandoned. This application Sep. 29, 1988, Ser. No. 250,577

Int. Cl.[4] C08L *51/04; C08F 265/04*

U.S. Cl. 525—305 **12 Claims**

1. A composition of matter in the form of an overpolymer comprising (1) a rubbery alkyl acrylate polymer, (2) a crosslinked and grafted overcoat of a polymer having a Tg value of greater than about 20° C., and (3) a grafted and uncrosslinked overcoat of a polymer having a Tg value of greater than about 20° C. said overcoat polymers comprising copolymers of styrene and acrylonitrile containing from about 10 to about 40 weight percent acrylonitrile and from 0 to 50 weight percent methylmethacrylate and wherein in the polymerization of said uncrosslinked overcoat, greater than 30 percent of the polymer is grafted.

4,879,349

SELECTIVE HYDROGENATION PROCESS

Ronald J. Hoxmeier, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 5, 1987, Ser. No. 116,981

Int. Cl.[4] C08F *8/04*

U.S. Cl. 525—332.8 **36 Claims**

1. A method for preparing a selectively hydrogenated copolymer having a residual ethylenic unsaturation of at least 2 and no more than about 20 percent, the method comprising:

(a) providing an unsaturated copolymer comprising monomer units of at least two different conjugated diolefins, at least one of said conjugated diolefins being an unsubstituted linear conjugated diolefin capable of imparting Type I ethylenic unsaturation to the copolymer and the other of said conjugated diolefins selected from monomers capable of imparting 2 to about 20%, based on total copolymer ethylenic unsaturation, Type II ethylenic unsaturation;

(b) contacting said unsaturated copolymer, in solution, at a temperature within range of about 40° C. to about 110° C., with hydrogen at a partial pressure within range of from

about 100 psig to about 1000 psig in the presence of an amount of a selective hydrogenation catalyst and for a time effective for selective hydrogenation of at least about 90% of the Type I and less than about 10% of the Type II ethylenic unsaturation; and

(c) recovering a selectively hydrogenated copolymer having a residual ethylenic unsaturation of at least 2 and not more than about 20 percent.

4,879,350

DEHYDROGENATED POLYCYCLOPENTADIENE

Bernd Tieke, Giffers, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sep. 11, 1987, Ser. No. 95,074

Claims priority, application Switzerland, Sep. 19, 1986, 3757/86

Int. Cl.[4] C08F *8/06*

U.S. Cl. 525—332.1 **5 Claims**

1. A dehydrogenated polycyclopentadiene which is insoluble in organic solvents, having a specific conductivity of at least 10^{-7} S.cm^{-1} and containing essentially the recurring structural units of the formulae III to VIII

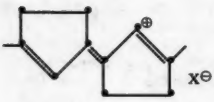
(III)

(IV)

(V)

(VI)

(VII)



(VIII)

in which X⊖ is an anion derived from iodine or from a metal pentahalide or metalloid pentahalide.

4,879,351

ISOMERIZED TERPENE TACKIFIER RESINS

Robert W. Schluenz, Panama City, Fla., assignor to Arizona Chemical Company, Panama City, Fla.

Filed Aug. 15, 1988, Ser. No. 232,024

Int. Cl.[4] C08F *8/00*

U.S. Cl. 525—332.1 **12 Claims**

1. A method for producing tackifier resins of improved compatibility with elastomers from terpene polymers or copolymers of terpene and hydrocarbon monomers which comprises isomerization of said polymers or copolymers by heating them to a temperature between 200° to 260° C. in the presence of an effective catalytic amount of iodine.

4,879,352

ADDUCTS OF AN AMINOALCOHOL AND NITRILE RUBBER

Janet B. Fulton, and Philip D. Edwards, both of Sarnia, Canada, assignors to Polysar Limited, Sarnia, Canada

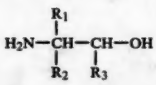
Filed Dec. 30, 1988, Ser. No. 291,964

Int. Cl.[4] C08F *8/32*

U.S. Cl. 525—329.3 **10 Claims**

1. A method to prepare an adduct of

(a) an aminoalcohol of the formula



wherein R_1 is selected from H and methyl,

R_2 is selected from H and methyl,

R_3 is selected from H, a C_{1-5} alkyl and aryl, and

(b) a rubbery copolymer of a C_{3-5} α,β unsaturated nitrile and a C_{4-6} conjugated diene, said method consisting of

(i) providing a solution of said copolymer and said aminoalcohol,

(ii) adding to said solution a metal compound selected from zinc acetate and cadmium acetate, and

(iii) heating said solution to a temperature of from 100° to 180° C.

4,879,353

BROMINATION OF POLYSTYRENE USING BROMINE AS THE REACTION SOLVENT

David C. Sanders; John L. Sands, and Joseph L. Stahl, all of West Lafayette, assignors to Great Lakes Chemical Corporation, West Lafayette, Ind.

Continuation of Ser. No. 7,778, Jan. 28, 1987, abandoned. This application Oct. 28, 1988, Ser. No. 266,245

Int. Cl.[4] C08F *8/22*

U.S. Cl. 525—357 **6 Claims**

1. A process for producing brominated styrenic polymers containing about 10% to 75% by weight bromine comprising the steps of:

reacting a styrene homo- or co-polymer having an MPS molecular weight of from about 300 to about 1,500,000 under substantially anhydrous conditions with bromine chloride in the presence of from about 5 up to about 100 parts of liquid bromine per part of styrenic polymer as the sole reaction medium and a Lewis acid halide catalyst at a temperature of from about −20° C. up to about 60° C., the bromine chloride having been formed in situ by the addition of chlorine to the liquid bromine reaction solvent and in which the degree of bromination of the styrenic polymer is controlled by adjusting the molar ratio of chlorine to styrenic polymer; and

thereafter recovering the brominated styrenic polymer thereby produced.

4,879,354

MISCIBLE BLENDS OF AN AMIDE AND/OR IMIDE CONTAINING POLYMER AND A POLYARYLATE

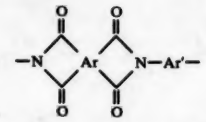
James E. Harris, Piscataway; Markus Matzner, Edison, both of N.J., and Lloyd M. Robeson, Macungie, Pa., assignors to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 82,869, Aug. 6, 1987, abandoned, which is a continuation-in-part of Ser. No. 16,744, Feb. 19, 1987, abandoned, which is a continuation-in-part of Ser. No. 894,198, Aug. 7, 1986, abandoned. This application Aug. 29, 1988, Ser. No. 237,991

Int. Cl.[4] C08L *67/00, 77/08*

U.S. Cl. 525—425 **9 Claims**

1. A miscible blend comprising a polyarylate and a polycarbonomide, said polycarbonomide comprising recurring units having the formula:



wherein Ar is an aromatic carbocyclic radical consisting of two aromatic nuclei linked through a divalent bridging group and Ar' is an aromatic carbocyclic radical consisting of a plurality of aromatic nuclei linked through isopropylidene moieties, and wherein said polycarbonomide comprises greater than about 5 wt. % isopropylidene moieties.

4,879,355

COMPATIBLE TRICOMPONENT POLYMER BLENDS

Ronald R. Light, and Robert W. Seymour, both of Kingsport, Tenn., assignors to Eastman Kodak, Rochester, N.Y.

Filed Sep. 29, 1988, Ser. No. 250,650
Int. Cl.[4] C08F *20/00*
U.S. Cl. 525—439 11 Claims

1. A clear polymer blend, the polymeric components consisting essentially of:

(1) 25–90 wt. % of a glycol copolyester having repeat units from 1,4 cyclohexanedimethanol, terephthalic acid and an alkylene glycol;

(2) 70–5 wt. % of a polycarbonate resin; and

(3) 5–45 wt. % of an aromatic polyester having repeat units from isophthalic acid or terephthalic acid/isophthalic acid mixtures and Bisphenol A.

4,879,356

METHOD OF MANUFACTURING SINGLE-COMPONENT POLYURETHANE BAKING ENAMELS

Rainer Gras, Bochum, Fed. Rep. of Germany, assignor to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Sep. 9, 1988, Ser. No. 242,303
Claims priority, application Fed. Rep. of Germany, Nov. 21, 1987, 3739478
Int. Cl.[4] C08L *75/05, 75/04*
U.S. Cl. 525—440 18 Claims

1. A method of manufacturing a single-component PUR baking enamel comprising:

preparing a binder which is the reaction product of a partially blocked polyisocyanate (A) having a free NCO content >10 wt% and a total NCO content of 21–37 wt.% and a hydroxyl group-containing polyhydroxy compound having more than two hydroxy groups per molecule; and

combining the reaction product with baking enamel additives in a solvent employable for baking enamels.

4,879,357

NOVEL POLY(ALKYLENE CARBONATE) POLYAHLS HAVING MORE THAN ONE PENDANT ACID GROUP

Robert F. Harris, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Oct. 2, 1986, Ser. No. 914,686
Int. Cl.[4] C08F *283/02*
U.S. Cl. 525—462 25 Claims

1. An acid-functional polymer having a poly(alkylene carbonate) backbone and on the average greater than one terminal acid group per molecule.

4,879,358

PROCESS FOR FLUORINATING LINEAR ALTERNATING POLYKETONE POLYMERS AND ARTICLES PRODUCED THEREFROM

John R. Kastelic, Katy, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Sep. 29, 1988, Ser. No. 250,884
Int. Cl.[4] C08G *67/02*
U.S. Cl. 525—539 19 Claims

1. A process for fluorinating a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon wherein said process comprises exposing a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon to a gas mixture, wherein said gas mixture comprises 0.1–100% by volume fluorine and 0–99.9% by volume nitrogen at a temperature sufficient to cause a reaction between at least a portion of the polymer and the fluorine.

4,879,359

PROCESS FOR POLYMERISING ETHYLENE USING A CHROMIUM OXIDE CATALYST

Claude Chamla, Marignane, and John G. Speakman, Sausset les Pins, both of France, assignors to BP Chemicals Limited, London, England

Filed Dec. 24, 1987, Ser. No. 138,501
Claims priority, application France, Dec. 29, 1986, 8618289
Int. Cl.[4] C08F *2/34, 4/22*
U.S. Cl. 526—105 8 Claims

1. A process for the polymerisation of ethylene or the copolymerisation of ethylene and at least one other alpha-olefin in the gaseous phase, in the presence of a catalyst comprising a chromium oxide compound supported on silica, alumina, or mixtures thereof, or coprecipitates thereof, and activated by a thermal treatment in a non-reducing atmosphere at a temperature of at least 250° C. and at most equal to the temperature at which the support begins to sinter, the catalyst being used in the form of a powder of a prepolymer prepared during a prepolymerisation stage consisting essentially of contacting the catalyst with ethylene, alone or mixed with at least one other alpha-olefin, in the presence of an organometallic compound selected from organoaluminum, organomagnesium and organozinc compounds or a mixture of these compounds, until the prepolymer contains per gram 4×10^{-5} to 3 milligram-atoms of chromium, the process being characterised in that the prepolymer powder is subjected after the prepolymerisation and before use to at least one extraction operation comprising:

(1) contacting at a temperature of between 20 and 110° C. and with agitation the prepolymer in an inert atmosphere with a solution comprising:

(a) an inert hydrocarbon liquid in a quantity between 0.5 and 50 liters per kilogram of prepolymer and

(b) one or more organometallic compounds or an addition complex of at least two organometallic compounds, being soluble in the inert hydrocarbon liquid, and having the general formula:

$$RMR'_{(n-1)}$$

wherein M is a metal selected from aluminum, magnesium, zinc or boron, R is a hydrogen atom or an alkyl group comprising 1 to 12 carbon atoms or an alcoholate group comprising 1 to 12 carbon atoms and n is an integer corresponding to the valency of the metal M, the quantity of the organometallic compound used being such that the number of milligram-atoms of metal M is between 0.05 and 50 per kg of polymer, and

(2) separating and eliminating the liquid phase of the resulting mixture from the prepolymer in an inert atmosphere by filtration or decantation of the prepolymer and by drying the prepolymer in partial vacuum or by means of an inert hot gas flow, so that the prepolymer is obtained in

the form of a powder substantially free from hydrocarbon liquid.

4,879,360

POLYPHENYLENE ETHER RESIN COMPOSITION

Yoshinobu Kobayashi; Tosio Itou, and Takayuki Inoue, all of Mie, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Mar. 11, 1988, Ser. No. 167,238
Claims priority, application Japan, Mar. 13, 1987, 62-58561
Int. Cl.[4] C08G *65/48;* C08L *63/08, 71/04*
U.S. Cl. 525—396 11 Claims

1. A polyphenylene ether resin composition consisting essentially of (a) a polyphenylene ether resin, (b) a polyester resin, and (c) from 0.1 to 10 parts by weight, per 100 parts by weight of the total of the components (a) and (b), of an epoxidized liquid polybutadiene having an oxirane oxygen content of at least 0.07% by weight, said polyester resin being present in an amount of from 10 to 95% by weight based on the total amount of the components (a) and (b).

4,879,361

PREPARATION OF BEAD POLYMERS FROM WATER-SOLUBLE, ETHYLENICALLY UNSATURATED MONOMERS

Gerd Rehmer, Bobenheim-Boxheim; Manfred Niessner, Ludwigshafen; Wilfried Heide, Freinsheim; Heinrich Hartmann, Limburgerhof, and Karl-Clemens Peters, Bad Durkheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Mar. 16, 1988, Ser. No. 168,825
Claims priority, application Fed. Rep. of Germany, Mar. 26, 1987, 3709921
Int. Cl.[4] C08F *2/00*
U.S. Cl. 526—201 5 Claims

1. An improved process for preparing a polymer in bead form from water-soluble, ethylenically unsaturated monomers by reverse suspension polymerization of a suspension of an aqueous solution of the monomers in an inert hydrophobic liquid in the presence of a polymerization initiator and of a protective colloid, the improvement comprising using as the protective colloid a graft polymer obtainable by grafting a polymer (A) containing

(a) from 40 to 100% by weight of an aromatic monovinyl monomer,

(b) from 0 to 60% by weight of a monoethylenically unsaturated carboxylic acid of 3 to 6 carbon atoms, maleic anhydride and/or itaconic anhydride and

(c) from 0 to 20% by weight of other monoethylenically unsaturated monomers,

as copolymerized units with the proviso that the sum of the weight percentages (a) to (c) is always 100 and the polymer (A) has a molecular weight (number average) from 500 to 20,000 and a hydrogenation iodine number from 1.3 to 51 with a monomer mixture of

(1) from 70 to 100% by weight of an acrylic ester and/or methacrylic ester of a monohydric alcohol containing from 1 to 20 carbon atoms,

(2) from 0 to 15% by weight of a monoethylenically unsaturated carboxylic acid of 3 to 6 carbon atoms, maleic anhydride and/or itaconic anhydride,

(3) from 0 to 10% by weight of an acrylic monoester and/ or methacrylic monoester of a not less than dihydric alcohol,

(4) from 0 to 15% by weight of an aromatic monovinyl monomer and

(5) from 0 to 7.5% by weight of acrylamide and/or methacrylamide with the proviso that the sum of the weight percentages (1) to (5) is always 100, at up to 150° C. in an inert hydrophobic diluent in the presence of a polymerization initiator, the monomers being used in an amount from 97.5 to 50% by weight based on the mixture of polymer (A) and monomers.

4,879,362

MODIFIED POLYTETRAFLUOROETHYLENE RESINS

Richard A. Morgan, Vienna, W. Va., assignor to E. I. DuPont De Nemours and Company, Wilmington, Del.

Filed Dec. 31, 1987, Ser. No. 140,249
Int. Cl.[4] C08F *16/24*
U.S. Cl. 526—247 10 Claims

1. A dispersion-process-produced non-melt-processible tetrafluoroethylene copolymer comprising recurring units of tetrafluoroethylene and a comonomer selected from the class consisting of hexafluoropropylene, perfluoro (alkyl vinyl ether) where the alkyl group has 1–4 carbons, and a mixture of them; with enough comonomer present in the shell to cause the copolymer to compound uniformly with an elastomer or plastic without forming visible agglomerates.

4,879,363

ORGANIC GLASS FOR OPTICAL PARTS

Yoshiharu Fujio; Kanemasa Matsukuma, and Toshihiko Nishimoto, all of Amagasaki, Japan, assignors to Daiso Co., Ltd., Osaka, Japan

Filed Oct. 12, 1988, Ser. No. 256,469
Claims priority, application Japan, Oct. 15, 1987, 62-261268
Int. Cl.[4] C08F *18/18*
U.S. Cl. 526—314 8 Claims

1. An organic glass for optical parts which comprises a copolymer of

(a) 40 to 80 wt. % of a diallyl phthalate monomer,

(b) 10 to 35 wt. % of an allyl benzoate monomer, and

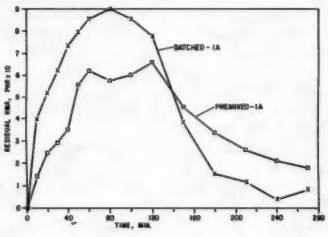
(c) 5 to 50 wt. % of a glycol bis(allylcarbonate) monomer.

4,879,364

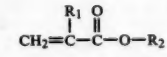
FILM OF CARBOXYLATED ACRYLATE LATEX, AND ARTICLE MADE THEREFROM

Vic Stanislawczyk, Sheffield Lake, Ohio, assignor to The B.F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 921,166, Oct. 20, 1986, abandoned. This application Feb. 13, 1989, Ser. No. 310,262
Int. Cl.[4] G08F *122/02*
U.S. Cl. 526—318.2 15 Claims



1. An elastomeric self-supporting film consisting essentially of predominantly acrylate-containing, crosslinked polymer chains including repeating units derived from itaconic acid and an acrylate represented by the structure



(I)

wherein

R_1 is hydrogen or methyl;

R_2 represents C_1–C_{20} alkyl, C_2–C_7 alkoxyalkyl, C_2–C_7 alkylthioalkyl, or C_2–C_7 cyanoalkyl;

said crosslinking is effected by a crosslinking monomer present in an amount in the range from 0.1 phr to 20 phr;

said itaconic acid is present in the range from about 1 phr to about 20 phr:

at least 40 phr of said acrylate in said film is present as an alkyl acryla hich alkyl is C_4–C_8, and,

said film has a T_g in the range from −20° C. to −60° C., a tensile strength of at least 300 psi at 350% elongation, and less than a 20% hysteresis loss.

4,879,365

HIGH PREFORMANCE ONE-COMPONENT URETHANE COMPOSITIONS WITH EXCELLENT WEATHERING PROPERTIES AND METHOD FOR MAKING AND USING SAME

Glenn H. Petschke, Lancaster, and Bernard Taub, Williamsville, both of N.Y., assignors to NL Chemicals, Inc., New York, N.Y.

Filed Nov. 14, 1988, Ser. No. 270,750
Int. Cl.[4] C08G *18/28*
U.S. Cl. 528—49 41 Claims

1. A compound comprising at least one oxazolidine ring chemically combined from the nitrogen atom of the ring through an alkylene-urethane linking group to a tetramethylxylylenediisocyanate prepolymer radical, said prepolymer radical containing at least one isocyanate group.

4,879,366

PREPARATION OF AROMATIC OLIGOMERS

Viktors Jansons, Los Gatos, and Heinrich C. Gors, Mountain View, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 87,111, Aug. 18, 1987, abandoned, which is a division of Ser. No. 790,030, Oct. 22, 1985, Pat. No. 4,721,771, which is a continuation-in-part of Ser. No. 772,182, Aug. 30, 1985, abandoned, which is a continuation of Ser. No. 659,741, Oct. 11, 1984, abandoned, which is a continuation-in-part of Ser. No. 594,503, Mar. 29, 1984, abandoned, which is a continuation-in-part of Ser. No. 481,083, Mar. 31, 1983, abandoned. This application Jan. 11, 1989, Ser. No. 296,907
Int. Cl.[4] C08G *2/00, 4/00*
U.S. Cl. 528—125 25 Claims

1. A method for the preparation of an arylene ketone or an arylene sulfone oligomer which comprises reacting, in the presence of free Lewis acid and a complex between a Lewis acid and a Lewis base, a monomer system comprising

the combination of at least one activated monomer of the formula

H—(A2)—H

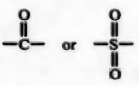
and, in an amount approximately equimolar with said activated monomer, at least one monomer of the formula

X—B—(A3—B)$_n$—X

wherein

A2 and A3 are divalent aromatic moieties, which can be the same or different,

B is



H is a hydrogen displaceable under Friedel-Crafts conditions, X is a group displaceable under Friedel-Crafts conditions, and n is 0–2, said reaction being conducted under such conditions as to produce an oligomer having an inherent viscosity of less than 0.6 and having at least 2 repeat units.

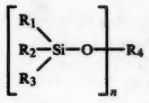
4,879,367

PROCESS FOR THE PREPARATION OF ALIPHATIC POLYCARBONATES WITH ALKOXY SILANE INITIATOR

Karl-Erwin Piejko, Cologne; Bruno Bömer, Bergisch Gladbach; Hans-Josef Buysch, Krefeld, and Michael Hüllmann, Heppenheim, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 29, 1988, Ser. No. 212,817
Claims priority, application Fed. Rep. of Germany, Jul. 14, 1987, 3723194
Int. Cl.[4] C08G *63/62*
U.S. Cl. 528—371 10 Claims

1. A process for the preparation of an aliphatic polycarbonate comprising polymerizing a cyclic, aliphatic carbonate in the presence of an initiator and a catalyst, wherein the initiator is an alkoxy silane of the formula



I

in which

R_1, R_2 and R_3 independently of one another are C_1–C_4-alkyl,

n is an integer from 1 to 6 and

R_4 is an n-valent aliphatic hydrocarbon radical or an n-valent substituted aliphatic hydrocarbon radical, and wherein the catalyst is a nucleophilic catalyst which is known from group transfer polymerization.

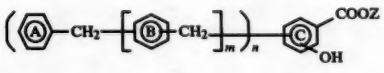
4,879,368

OLIGOBENZYLATED HYDROXYCARBOXYLIC ACID DERIVATIVE

Artur Botta, Krefeld, and Gert Jabs, Odenthal-Gloebusch, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 2, 1987, Ser. No. 104,732
Claims priority, application Fed. Rep. of Germany, Oct. 17, 1986, 3635311
Int. Cl.[4] C08G *61/02*
U.S. Cl. 528—397 5 Claims

1. An oligobenzylated aromatic acid of the following formula I



I

in which

Z denotes hydrogen, alkyl having 1 to 6 C atoms or

M denotes metal cation

z denotes 1 to 4,

n denotes 1 to 4,

m denotes 0 to 20 subject to the proviso that

m+n denotes at least 2, rings A, B and C are unsubstituted or substituted independently of each other or the oligobenzylated aromatic acid can be in bimolecular form wherein 2 radicals of the formula I are linked with each other and wherein the substituents on rings A, B and C represent the members for completing a 6-membered carbocyclic ring with the benzene nucleus.

4,879,369

METHOD OF REMOVING LIGNIN FROM TALL OIL

Carlton G. Force, Mt. Pleasant, S.C., assignor to Westvaco Corporation, New York, N.Y.

Filed Jan. 20, 1988, Ser. No. 146,200
Int. Cl.[4] C09F *1/02*; B01D *3/14*
U.S. Cl. 530—205 4 Claims

1. A method of processing tall oil for use as an emulsifier in the polymerization of rubber comprising the steps of:

sparging crude tall oil at a temperature of between about 350° F. and 400° F. with a carrier gas for at least about one hour to depolymerize and remove lower molecular weight lignin materials from the crude tall oil, then

heat-treating the sparged crude tall oil at a temperature of between about 500° F. and 525° F. for about two hours to polymerize any lignin remaining therein, then

fractionally distilling the crude tall oil, said distilling including the removal of a pitch fraction containing polymerized lignin, then

disproportionating the tall oil by heating the distilled tall oil in the presence of a disproportionation catalyst at a temperature of about 425° F. and then

sparging the disproportioned tall oil with a carrier gas to remove said disporportionation catalysts.

4,879,370

GLUTATHIONE DELIVERY SYSTEM

Alton Meister, New York, N.Y., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.

Division of Ser. No. 68,306, Jul. 1, 1987, Pat. No. 4,784,685, which is a division of Ser. No. 817,696, Jan. 10, 1986, Pat. No. 4,710,489, which is a continuation-in-part of Ser. No. 557,555, Dec. 2, 1983, abandoned. This application Jul. 27, 1988, Ser. No. 225,672
Claims priority, application Japan, Apr. 22, 1985, 60-86974; Apr. 22, 1985, 60-86975; Apr. 22, 1985, 60-86976
Int. Cl.[4] C07K *5/08*
U.S. Cl. 530—331 3 Claims

1. Substantially pure monomethyl glutathione, only the glycine carboxyl group being esterified.

4,879,371

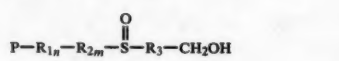
SOLID PHASE PEPTIDE SYNTHESIS

Daniel P. Getman, St. Louis, and Robert M. Heintz, Ballwin, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 946,558, Dec. 24, 1986, Pat. No. 4,764,595. This application Jun. 20, 1988, Ser. No. 208,942
Int. Cl.[4] C07K *1/04*, *1/06*
U.S. Cl. 530—334 5 Claims

1. A method of synthesizing a peptide comprising

(a) anchoring protected carboxyl terminal amino acid to a resin of the formula



where R_1 is a substituted or unsubstituted aromatic, R2 is an alkyl having from 1 to 20 carbon atoms, R_3 is a substituted or unsubstituted phenyl and n and m independently equal 0 or 1 to form a benzyl ester linkage;

(b) deprotecting the anchored amino acid;

(c) neutralizing the anchored amino acid to convert to an amine;

(d) coupling a protected carboxyl terminal amino acid to the amine of step (c);

(e) repeating steps (b), (c) and (d) to synthesize the desired peptide on the resin of step (a);

(f) reducing the sulfoxide to a sulfide; and

(g) cleaving the peptide from the resin to obtain the synthesized peptide.

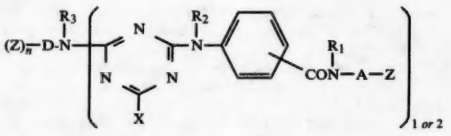
4,879,372

FIBER REACTIVE COMPOUND HAVING SYM-TRIAZINE AND AMINOBENZOYLAMINE MOIETIES

Toshihiko Morimitsu, Minoo; Naoki Harada, Suita, and Takashi Omura, Ashiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Nov. 6, 1987, Ser. No. 117,552
Claims priority, application Japan, Nov. 14, 1986, 61-272572
Int. Cl.[4] C09B *62/085*, *62/09*, *62/51*, *62/513*
U.S. Cl. 534—618 8 Claims

1. A compound represented by the formula,



wherein X is chloro or fluoro, R_1, R_2 and R_3 independently of one another are each hydrogen or alkyl unsubstituted or substituted with hydroxy, cyano, C_{1-4} alkoxy, halogeno, carboxy, carbamoyl, C_{1-4} alkoxycarbonyl, C_{1-4} alkylcarbonyloxy, sulfo or sulfamoyl, A is unsubstituted phenylene or naphthylene unsubstituted or substituted with sulfo, Z is $—SO_2CH=CH_2$ or $—SO_2CH_2CH_2Y$ in which Y is a group splittable by the action of an alkali, D is an anionic dye moiety, and n is 0, 1 or 2.

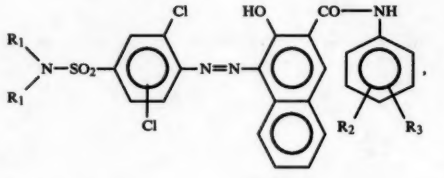
4,879,373

1-(DICHLORO-4'-SULFAMOYL OR SUBSTITUTED SULFAMOYL-PHENYAZO)-2-HYDROXY-3-PHENYL-CARBAMOYL OR SUBSTITUTED PHENYLCARBAMOYL-NAPHTHALENES

Bansi L. Kaul, Biel-Benken, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Continuation of Ser. No. 812,871, Dec. 23, 1985, abandoned, which is a division of Ser. No. 659,246, Oct. 10, 1984, Pat. No. 4,623,397, which is a division of Ser. No. 410,175, Aug. 20, 1982, abandoned. This application Feb. 19, 1987, Ser. No. 16,300
Claims priority, application Fed. Rep. of Germany, Aug. 28, 1981, 3134126
Int. Cl.[4] C09B *29/01*, *19/20*; D06P *1/44*
U.S. Cl. 534—864 19 Claims

1. A compound of the formula



wherein

each R_1 is independently hydrogen, C_{1-8}alkyl, cyclohexyl or C_{2-3}alkyl substituted by 1 or 2 substituents selected from halo, hydroxy, cyano, methoxy, ethoxy and (C_{1-2}alkoxy)-carbonyl, and

each of R_2 and R_3 is independently hydrogen, chloro, bromo, methyl, methoxy or ethoxy.

4,879,374

BOVINE INTERLEUKIN-1β DNA SEQUENCE

Douglas P. Cerretti; Brian S. Davis, and Charles R. Maliszewski, all of Seattle, Wash., assignors to Immunex Corporation, Seattle, Wash.

Filed Mar. 13, 1987, Ser. No. 25,462
Int. Cl.[4] C07H *19/073*
U.S. Cl. 536—27 6 Claims

1. An isolated DNA segment encoding bovine interleukin-1β (bIL-1β).

2. An isolated DNA segment having a nucleotide sequence encoding the following amino acid sequence:

Ala Pro Val Gln Ser Ile Lys Cys Lys Leu Gln Asp Arg Glu Gln

Lys Ser Leu Val Leu Ala Ser Pro Cys Val Leu Lys Ala Leu His

Leu Leu Ser Asp Glu Met Asp Arg Glu Val Val Phe Cys Met

Ser Phe Val Gln Gly Glu Glu Arg Asp Asp Lys Ile Pro Val

Ala Leu Gly Ile Lys Asp Lys Asp Leu Tyr Leu Ser Cys Val

Lys Lys Gly Asp Thr Pro Thr Leu Gln Leu Glu Glu Val Asp

Pro Lys Val Tyr Pro Lys Arg Asp Met Glu Lys Arg Phe Val

Phe Tyr Lys Thr Glu Ile Lys Asp Thr Val Glu Phe Glu Ser

Val Leu Tyr Pro Asp Trp Tyr Ile Ser Ser Ser Gln Ile Glu

Glu Arg Pro Val Phe Leu Gly His Phe Arg Gly Gly Gln Asp

Ile Thr Asp Phe Arg Met Glu Thr Leu Ser Pro

3. An isolated DNA segment having the following sequence of nucleotides:

GCA CCC GTG CAG TCA ATA AAG TGC AAA CTC CAG

GAC AGA GAG CAA AAA TCC CTG GTG CTG GCT AGC

CCA TGT GTG CTG AAG GCT CTC CAC CTC CTC TCA

CAG GAA ATG AAC CGA GAA GTG GTG TTC TGC ATG

AGC TTT GTG CAA GGA GAG GAA AGA GAC AAC

AAG ATT CCT GTG GCC TTG GGT ATC AAG GAC AAG

AAT CTA TAC CTG TCT TGT GTG AAA AAA GGT GAT

ACG CCC ACC CTG CAG CTG GAG GAA GTA GAC CCC

AAA GTC TAC CCC AAG AGG AAT ATG GAA AAG

CGC TTT GTC TTC TAC AAG ACA GAA ATC AAG AAT

ACA GTT GAA TTT GAG TCT GTC CTG TAC CCT AAC

TGG TAC ATC AGC ACT TCT CAA ATC GAA GAA AGG

CCC GTC TTC CTG GGA CAT TTT CGA GGT GGC CAG

GAT ATA ACT GAC TTC AGA ATG GAA ACC CTC TCT

CCC

4,879,375

PREPARATION OF HYALURONIC ACID FROM SYNOVIAL FLUID

David Cullis-Hill, 111 Bronte Road, Bondi Junction N.S.W., Australia (2022)

PCT No. PCT/AU86/00129, § 371 Date Feb. 9, 1987, § 102(e) Date Feb. 9, 1987, PCT Pub. No. WO86/06728, PCT Pub. Date Nov. 20, 1986
PCT Filed May 7, 1986, Ser. No. 2,699
Claims priority, application Australia, May 9, 1985, PH0496
Int. Cl.[4] C07H *5/04;* C07G *17/00*
U.S. Cl. 536—55.1 22 Claims

1. A method of preparing high purity hyaluronic acid with a protein impurity of less than or equal to 0.5% w/w from synovial fluid comprising the steps of:

(a) removing high molecular weight impurities, if present, from the synovial fluid;

(b) dissolving a metallic salt and free radical inhibitor in the synovial fluid;

(c) precipitating hyaluronic acid and protein by adding sufficient of a water miscible alcohol to said synovial fluid;

(d) separating the precipitate from step (c) and dissolving the hyaluronic acid contained therein in a solution in which the protein is insoluble;

(e) adding an effective amount of a free radical inhibitor to the step (d) solution;

(f) digesting the protein by treating said solution with an effective enzyme at a temperature of about 37° C. for a period of from 2 to 3 hours; and

(g) recovering hyaluronic acid.

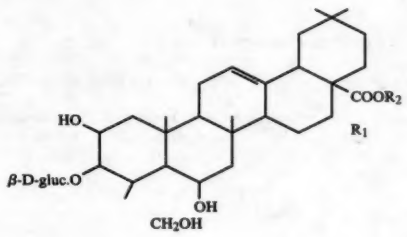
4,879,376

TRITERPENE SAPONINS HAVING ANTI-INFLAMMATORY, MUCOLYTIC AND ANTIEDEMIC ACTIVITIES, PROCESS FOR THE PREPARATION THEREOF AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Piero Foresta; Orlando Ghirardi, both of Rome; Bruno Gabetta, and Aldo Cristoni, both of Milan, all of Italy, assignors to Sigma-Tau Industrie Farmaceutiche Riunite S.p.A., Rome and Inverni Della Beffa Industria Chimico Farmeceutica Derivati Naturali, Milan, both of, Italy

Filed Jun. 26, 1987, Ser. No. 67,948
Claims priority, application Italy, Jul. 1, 1986, 48208 A/86
Int. Cl.[4] A61K *31/705, 31/70, 35/78*
U.S. Cl. 536—18.1 8 Claims

1. A triterpene saponin of the general formula



wherein:

R_1 is H or OH, and

R_2 is a tetrasaccharide residue having 573 mass units or a pentasaccharide residue having 705 mass units, wherein R_2 is attached to the C-28 carboxyl by an ester bond.

4,879,377

NUCLEOSIDE PROCESS

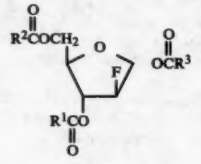
Steven P. Brundidge, Wolcott; Henry G. Howell; Chester Sapino, Jr., both of East Syracuse, all of N.Y., and Chou Hong-Tann, Berkeley Heights, N.J., assignors to Bristol-Myers Company, New York, N.Y.

Continuation of Ser. No. 795,551, Nov. 6, 1985, abandoned, which is a division of Ser. No. 574,329, Nov. 18, 1983, Pat. No. 4,625,020. This application Jul. 28, 1988, Ser. No. 227,416

Int. Cl.[4] C07H *1/00*

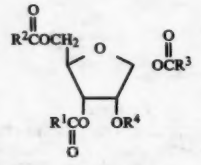
U.S. Cl. 536—18.2 **14 Claims**

1. The process for preparing the 1,3,5-tri-O-acyl-2-deoxy-2-fluoroarabinofuranoside ester of Formula VI



VI

wherein R^1, R^2, and R^3 are the carbonyl attached organic groups of carboxylic acyl groups having 1 to 20 carbon atoms and selected from alkanoyl, aroyl, and substituted aroyl wherein said substituent is alkyl, alkoxy, halo, nitro, or dinitro which comprises contacting potassium acid fluoride with the ribofuranoside ester of Formula V



V

wherein R^1, R^2, and R^3 have the same meaning as above and R^4 is the 1-imidazosulfonyl or the $—SO_2F$ group in an organic liquid reaction medium at 75°–170° C. until maximal production of product has occurred.

4,879,378

POLYSILOXANES WITH PENDANT STERICALLY HINDERED PHENOL MOIETY CONNECTED TO THE SILICON ATOM VIA A CARBONYLYOXY-CONTAINING LINK

George N. Foster, Bloomsbury, N.J.; Herbert E. Petty, Bethel, Conn., and Charles H. Blevins, II, Beacon, N.Y., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Mar. 30, 1989, Ser. No. 330,811

Int. Cl.[4] C07F *7/08*

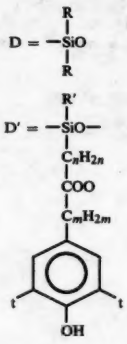
U.S. Cl. 556—439 **11 Claims**

1. A polysiloxane of the formula:

$$MD_xD'_yM \qquad (I)$$

wherein

M = $R''R_2SiO_{\frac{1}{2}}$—



R = phenyl or a lower alkyl group;

R′ = phenyl, phenethyl or an alkyl group having 1 to about 8 carbon atoms;

R″ = phenyl or an alkyl group or an alkoxy group having from 1 to about 30 carbon atoms;

t = tert-butyl;

n has a value of from 0 to about 10;

m has a value of about 2 to about 10;

x has a value of from 0 to about 250; and

y has a value of from 4 to about 250.

4,879,379

NOVEL PLATINUM-STEROID COMPLEXES

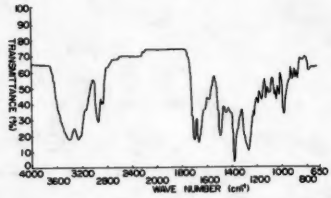
Yoshinori Kidani, and Masahide Noji, both of Nagoya, Japan, assignors to Yoshinori Kidani, Aichi, Japan

Filed Sep. 17, 1987, Ser. No. 99,298

Claims priorjty, application Japan, Sep. 19, 1986, 61-219428

Int. Cl.[4] C07J *1/00*

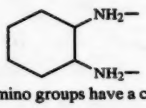
U.S. Cl. 540—3 **9 Claims**



1. An antitumor platinum(II)-steroid complex represented by the general formula (I)

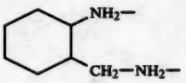
(I)

wherein A and A′ taken together form a 1,2-cyclohexanediamine ligand of the formula:



where the 1- and 2-amino groups have a configuration selected

from cis-, trans-l- and trans-d-, relative to the cyclohexane ring; or A and A′ taken together form a 2-(aminomethyl)cyclohexylamine ligand of the formula:



where the 1-amino group and 2-aminomethyl group have a configuration selected from cis-l-, cis-d-, trans-l- and trans-d-, or a mixture thereof, relative to the cyclohexane ring; or A and A′ taken together form an ethylenediamine ligand of the formula:

or A and A′ each denote a group NH_3—, and B denotes a steroid compound which coordinates the platinum(II) atom and is selected from the group consisting of cortisone, hydrocortisone, prednisone, prednisolone, methylprednisone, methylprednisolone, 17-α-hydroprogesterone, estrone, estriol, progestrone, cholic acid, deoxycholic acid, androsterone, testosterone and testosterone propionate, or a nitrate of the platinum(II)-steroid complex of the formula (I).

4,879,380

PROCESS FOR CONDITIONING CRUDE POLYHALOGENATED PIGMENTS USING A HETEROCYCLIC ORGANIC SOLVENT

John Henry Banties, and Thomas Edward Donegan, both of Holland, Mich., assignors to BASF Corp., Parsippany, N.J.

Filed May 5, 1988, Ser. No. 190,457
Int. Cl.[4] C09B *47/00*
U.S. Cl. 540—137 **11 Claims**

1. A process for conditioning crude polyhalogenated phthalocyanine pigments, the process comprising:

(a) combiining the polyhalogenated phthalocyanine pigment crude with a heterocyclic organic liquid in which the pigment has a solubility of between 1 part in 10^3 and 1 part in 10^6, the ratio of pigment to organic liquid being between 1.5:1 and 3.5:1 on a weight basis, whereby a mixture is formed; and

(b) mixing the mixture under high shear conditions so that polyhalogenated phthalocyanine pigment crystals are produced.

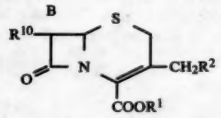
4,879,381

7-(SUBSTITUTED OR UNSUBSTITUTED AMINO) 3-SUBSTITUTED METHYL-^{3}CEPHEM-4-CARBOXYLIC ACID

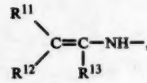
Hiroshi Sadaki; Narita Hirokazu; Hiroyuki Imaizumi, all of Toyama; Yoshinori Konishi, Takaoka; Takihiro Inaba, Namerikawa; Tatsuo Hirakawa, Toyama; Hideo Taki, Sagamihara; Masaru Tai, Toyama; Yasuo Watanabe, Toyama, and Isamu Saikawa, Toyama, all of Japan, assignors to Toyoma Chemical Company, Ltd., Tokyo, Japan

Division of Ser. No. 654,681, Sep. 26, 1984, Pat. No. 4,673,738, which is a division of Ser. No. 304,912, Sep. 23, 1981, Pat. No. 4,489,072. This application Mar. 6, 1987, Ser. No. 22,433
Claims priority, application Japan, Sep. 25, 1980, 55-132253; Nov. 12, 1980, 55-158184; Dec. 13, 1980, 55-175263
The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.
Int. Cl.[4] C07D *31/545*
U.S. Cl. 540—222 **5 Claims**

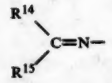
1. A 7-(substituted or unsubstituted amino)-3-substituted methyl-Δ^3-cephem-4-carboxylic acid represented by the following formula or a salt thereof:



wherein R^1 represents a hydrogen atom or a carboxyl protecting group; R^2 represents a 1,2,4-triazolyl group in which carbon atoms in the 1,2,4-triazolyl ring may be substituted by one or two substituents selected from the group consisting of halogen, C_{1-14}-alkyl, benzyl, phenethyl, 4-methylbenzyl, naphthylmethyl, phenyl, naphthyl, indanyl, C_{2-10}-alkenyl, hydroxyl, protected hydroxyl, oxo, C_{1-14}-alkylthio, nitro, cyano, amino, protected amino, C_{1-14}-alkylamino, di-C_{1-14}-alkylamino, C_{1-12}-acyl, C_{1-12}-acyloxy, C_{1-12}-acyl-C_{1-14}-alkyl, carboxyl, protected carboxyl, carbamoyl, amino-C_{1-14}-alkyl, N-C_{1-14}-alkylamino-C_{1-14}-alkyl, N,N-di-C_{1-14}-alkylamino-C_{1-14}-alkyl, hydroxy-C_{1-14}-alkyl, hydroxyimino-C_{1-14}-alkyl, C_{1-14}-alkoxy-C_{1-14}-alkyl, carboxy-C_{1-14}-alkyl, C_{1-14}-alkoxyarbonyl-C_{1-14}-alkyl, benzyloxycarbonyl-C_{1-14}-alkyl, phenethyloxycarbonyl-C_{1-14}-alkyl, 4-methylbenzyloxycarbonyl-C_{1-14}-alkyl, naphthylmethyloxycarbonyl-C_{1-14}-alkyl, sulfo-$_{1-14}$-alkyl, sulfo, sulfamoyl-C_{1-14}-alkyl, carbamoyl-C_{1-14}-alkyl, carbamoyl-C_{2-10}-alkenyl and N-hydroxycarbamoyl-C_{1-14}-alkyl, with the proviso that when two substituents are selected from hydroxyl, protected hydroxyl, amino, protected amino, carboxyl and protected carboxyl, the combinations of hydroxyl and protected hydroxyl, amino and protected amino, and carboxyl and protected carboxyl are to be excluded, said 1,2,4-triazolyl group being attached to the exomethylene group at the 3-position of the cephem ring through a carbon-nitrogen bond; R^{10} represents an amino group, a protected amino group represented by the formula



or by the formula



in which R^{11}, R^{12}, R^{13}, R^{14} and R^{15}, which may be identical or different, are hydrogen atoms or C_{1-14}-alkyl, C_{2-10}-alkenyl, C_{3-7}-cycloalkyl, C_{5-7}-cycloalkenyl, phenyl, naphthyl, indanyl, benzyl, phenethyl, 4-methylbenzyl, naphthylmethyl, furyl, thienyl, pyrrolyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, thiadiazolyl, oxadiazolyl, thiatriazolyl, oxatriazolyl, triazolyl, tetrazolyl, pyridyl, N-methylpiperidinyl, quinolyl, phenazinyl, 1,3-benzodioxolanyl, benzofuryl, benzothienyl, benzoxazolyl, benzothiazolyl, coumarinyl or acyl groups in which the above-mentioned heterocyclic groups are attached to adjacent carbon atom through carbon-carbon bond, which acyl can be derived from formic acid, acetic acid, propionic acid, butanoic acid, isobutanonic acid, pentanoic acid, methoxyacetic acid, methylthioacetic acid, acrylic acid, crotonic acid, cyclohexanoic acid, cyclopentaneacetic acid, cyclohexaneacetic acid, cyclohexanepropionic acid or cyclohexadieneacetic acid; and B represents a hydrogen atom or a C_{1-5}-alkoxy group.

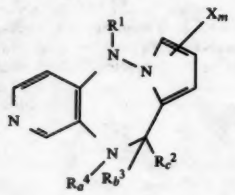
4,879,382

PYRIDO(3,4-F)PYRROLO(1,2-B)(1,2,5)TRIAZEPINES

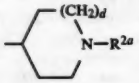
Richard C. Effland, Bridgewater; Larry Davis, Sergentsville; Kevin J. Kapples, Little York, and Gordon E. Olsen, Somerset, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals, Inc., Somerville, N.J.

Filed Jul. 25, 1988, Ser. No. 223,847
Int. Cl.[4] C07D *471/14*
U.S. Cl. 540—554 **30 Claims**

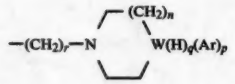
1. A compound of the formula:



wherein R^1 is loweralkyl, arylloweralkyl, or aminoloweralkyl; R^2 is hydrogen, loweralkyl, arylloweralkyl, aminoloweralkyl, aryl or a group of the formula



wherein d is an integer having a value of zero or 1 and R^{2a} is hydrogen, loweralkyl, arylloweralkyl or aminoloweralkyl; R^3 is hydrogen or loweralkyl, or together with R^2 constitutes a radical of the formula =O; R^4 is hydrogen, loweralkyl, arylloweralkyl, aminoloweralkyl, formyl, loweralkylcarbonyl, aminocarbonyl, arylaminocarbonyl, or a group of the formula



wherein W is carbon or nitrogen, Ar is aryl, q is an integer having a value from zero to 2, inclusive, p is an integer having a value of zero or 1, with the proviso that the sum of p and q is 1 when W is nitrogen and 2 when W is carbon, n is an integer having a value of zero or 1, and r is an integer having a value from 2 to 4, inclusive; X is halogen, loweralkyl, loweralkenyl, formyl or loweralkanol; m is an integer having a value of zero or 1; the dotted line is an optional bond; and a, b, and c, are integers having values of zero or one with the proviso that in the presence of said optional bond a is zero and the sum of b plus c is one, and in the absence of said optional bond a, b, and c each have a value of 1.

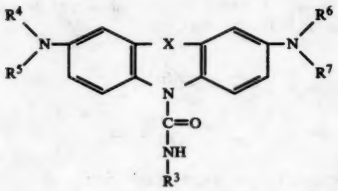
4,879,383

UREA DERIVATIVES

Yoshitsugu Sakata, Otsu; Kazunari Hashidume, Wakayama; Tsutomu Iwata, Kobe; Toyoharu Mukai, Daito, and Masaaki Kida, Suita, all of Japan, assignors to Wako Pure Chemical Industries, Ltd., Osaka, Japan

Filed Jun. 29, 1987, Ser. No. 67,050
Claims priority, application Japan, Jul. 1, 1986, 61-155872
Int. Cl.[4] C07D *265/38, 279/30*
U.S. Cl. 544—37 **4 Claims**

1. A urea derivative represented by the formula:



wherein X is S or O; each of R^4, R^5, R^6 and R^7 is independently selected from the group consisting of a C_1–C_6 alkyl group, a carboxy (C_1–C_6 alkyl) group, a hydroxy (C_1–C_6 alkyl) group and a (C_1–C_6 alkoxy) (C_1–C_6 alkyl) group;

R^3 is selected from the group consisting of a carboxy (C_1–C_6 alkyl) group, a (C_1–C_6 alkoxy) carbonyl group, a (C_1–C_6 alkyl) carbonyl group, an arylsulfonyl group, a sulfoaryl group, a carboxyaryl group, and a modified carboxy (C_1–C_6 alkyl) group wherein the carboxy moiety is in the form of a salt of an alkali metal, the aryl moiety in said arylsulfonyl group, sulfoaryl group and carboxyaryl group being selected from the group consisting of phenyl, tolyl, methoxyphenyl, naphthyl, methylnaphthyl and methoxynaphthyl.

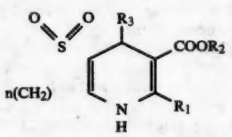
4,879,384

PREPARATION OF THIOCYCLOALKNO [3,2-B] PYRIDINES

Charles F. Schwender, Califon, and John H. Dodd, Lebanon, both of N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Jun. 15, 1988, Ser. No. 220,134
Int. Cl.[4] C07D *495/04*
U.S. Cl. 546—114 **1 Claim**

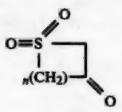
1. A process for preparing a compound of the formula



I

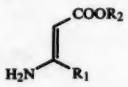
wherein n is an integer from 1 to 12; R_1 is hydrogen, amino, alkyl, haloalkyl or CH_2OR_2; R_2 is straight chained or branched alkyl having 1 to 8 carbon atoms, cycloalkyl having 3 to 7 carbon atoms, or alkylene-X, wherein X is alkoxy, hydroxy, halo, p-tosyloxy, mesyloxy, pyridyl, amino or $—NR_4R_5$, wherein R_4 and R_5 are the same or different and are selected from hydrogen, alkyl, cycloalkyl, phenyl, benzyl, phenylethyl, or R_4, R_5 and the nitrogen atom to which they are attached form a 5, 6 or 7 membered heterocyclic ring which optionally contains an oxygen or sulfur atom or an additional nitrogen atom, or said heterocyclic ring may be fused to a benzene ring, and in the instance wherein said heterocyclic ring is piperazino, said piperazino may optionally be substituted in the 4-position with the substituent R_6 which is selected from alkyl, cycloalkyl, benzyl, phenyl, or phenyl substituted by alkoxy, halo, alkyl, nitro or trifluoromethyl; R_3 is 2-pyridyl, 3-pyridyl, 3-pyridyl substituted at positions 2, 4, 5 or 6 with one or more groups selected from halogen, nitro, alkoxy, alkylthio, cyano, carbalkoxy, difluoromethoxy, difluoromethylthio or alkylsulfonyl; 2-thienyl, 3-thienyl, 2,1,3-benzoxadiazolyl, 2,1,3-benzthiadiazolyl or phenyl optionally substituted at positions 2 through 6 with one or more groups selected from hydrogen, alkyl, alkoxy, cyano, carbalkoxy, alkylthio, difluoromethoxy, difluoromethylthio, alkylsulfonyl, halo, nitro or trifluoromethyl; or the pharmaceutically acceptable acid and base addition salts thereof;

which process comprises reacting a compound of the formula (V)



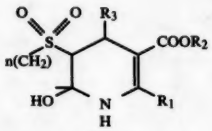
V

with a compound of formula (VI)



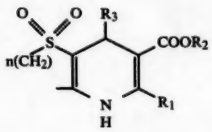
VI

and a compound of the formula R_3CHO (VII), to prepare a compound of the formula (VIII);



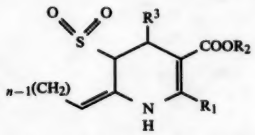
VIII

in the instance wherein n is 2, and thereafter dehydrating said compound (VIII) in order to prepare compound of the formula (Ia)



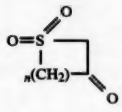
Ia

or to prepare a compound of the formula (XII)



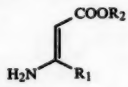
XII

in the instance wherein N is 3–12, by reacting a compound of the formula (V)



V

with a compound of the formula (VI)

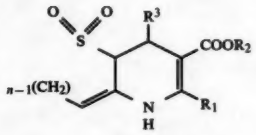


VI

and a compound of the formula (VII)

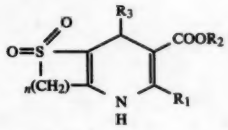
R_3CHO (VII)

to form a compound of the formula (XII)



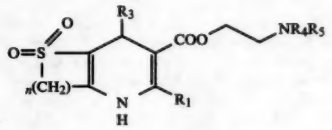
XII

and thereafter, if desired, converting compound XII to compound Ib by heating compounds XII with ethanolic hydrogen chloride or toluene to form a compound of the formula (Ib)



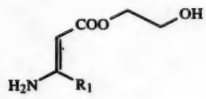
Ib

or in the instance wherein it is desired to prepare a final compound of the formula (Id)



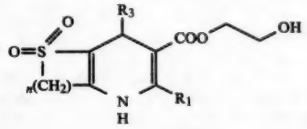
Id

reacting a compound of the formula (V) with a compound of the formula (VIa)



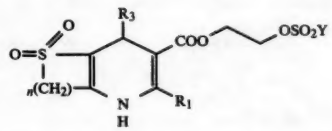
VIa

and a compound of the formula R_3CHO (VII) in order to prepare a compound of the formula (Ic)



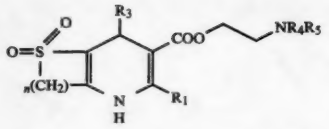
Ic

then reacting said compound (Ic) with a compound of the formula YSO_2Cl, wherein Y is p-methylphenyl or alkyl, in order to prepare a compound of the formula (X)



X

and thereafter reacting said compound (X) with a compound of the formula HNR_4R_5 (XI) to prepare a compound of the formula (Id)



Id

wherein in formulas Id, VIa, Ic and X represents an ethylene moiety.

4,879,385

SUBSTITUTED HYDROXYALKYL-AZOLES AND THEIR USE AS ANTIMYCOTICS

Hans-Ludwig Elbe, Wuppertal; Karl H. Büchel, Burscheid; Klaus Schaller, and Manfred Plempel, both of Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

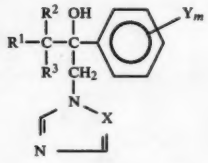
Continuation of Ser. No. 663,285, Oct. 22, 1984, abandoned, which is a continuation of Ser. No. 476,096, Mar. 17, 1983, abandoned. This application Jun. 15, 1987, Ser. No. 62,251

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1982, 3212388

Int. Cl.[4] A61K *31/41, 31/415;* **C07D** *249/12, 233/60*

U.S. Cl. 514—383 **14 Claims**

1. A substituted hydroxyalkyl-azole of the formula



in which

R^1 represents phenyl or —O—phenyl, each of which is monosubstituted to disubstituted by identical or different substituents, the phenyl substituents having the meaning of Y;

R^2 represents straight-chain or branched alkyl having 1 to 4 carbon atoms;

R^3 represents straight-chain or branched alkyl having 1 to to 4 carbon atoms;

X represents a nitrogen atom or the CH group;

Y represents halogen or alkyl having 1 to 4 carbon atoms, alkoxy and alkylthio, each having 1 to 4 carbon atoms, halogenoalkyl and halogenoalkoxy and halogenoalkylthio, each having 1 to 2 carbon atoms and 1 to 5 identical or different halogen atoms, and represents phenyl, phenoxy, phenylalkyl and phenylalkoxy which have 1 to 2 carbon atoms in the alkyl part or in the alkoxy part, and each of which are optionally substituted by halogen and alkyl having 1 to 2 carbon atoms and m represents the number 0, 1, 2 or 3.

4,879,386

ANTI-TUMOR DC-52 COMPOUNDS

Hiromitsu Saito, Sagamihara; Yoichi Uosaki; Akira Sato, both of Machida; Tadashi Hirata, Yokohama; Makoto Morimoto, Shizuoka, and Tadashi Ashizawa, Numazu, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., tokyo, Japan

PCT No. PCT/JP87/00708, § 371 Date May 25, 1988, § 102(e) Date May 25, 1988, PCT Pub. No. WO88/02369, PCT Pub. Date Apr. 7, 1988

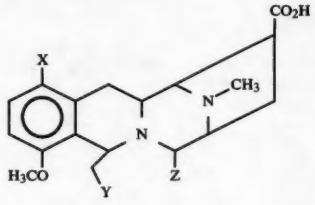
PCT Filed Sep. 28, 1987, Ser. No. 207,639

Claims priority, application Japan, Oct. 1, 1986, 61-233801

Int. Cl.[4] A61K *31/495;* **C07D** *471/18, 498/22*

U.S. Cl. 544—343 **1 Claim**

1. Derivatives of DC-52 represented by the formula:



wherein X is chlorine, bromine, iodine, hydroxyl, formyl, hydroxyiminomethyl, cyano, nitro, amino or lower alkanoylamino; and Y is hydroxyl and Z is cyano, and pharmacologically acceptable salts thereof.

4,879,387

METHOD FOR MANUFACTURE OF PHTHALIC ANHYDRIDE

Tadanori Hara, Kitakyushu, Japan, assignor to Nippon Steel Chemical Co., Ltd., Tokyo, Japan

Filed Apr. 5, 1988, Ser. No. 177,990

Claims priority, application Japan, Apr. 10, 1987, 62-087143

Int. Cl.[4] C07D *307/89*

U.S. Cl. 549—248 **17 Claims**

1. A method for the manufacture of phthalic anhydride by the catalytic oxidation of at least one raw material selected from the group consisting of naphthalene and ortho-xylene which comprises contacting a mixed gas containing naphthalene or orhoxylene or both and a molecular oxygen-containing gas with a catalyst bed comprising a first catalyst packed on the upstream side of the flow of said mixed gas and a second catalyst packed on the downstream side of the flow, wherein the first catalyst is deposited on a nonporous inactive carrier, said first catalyst having a catalytically active component consisting essentially of 90 to 67% by weight of titanium dioxide, 8 to 30% by weight of vanadium pentoxide, 2 to 5% by weight of cesium compound and 0.11 to 0.2 of cesium compound/vanadium pentoxide (molar ratio) (calculated as Cs_2SO_4), wherein specific surface area of the catalytically active component is at least 20 m^2/g, and the second catalyst is deposited on the nonporous inactive carrier, said catalyst having a catalytically active component composed of 94 to 67% by weight of titanium dioxide, 5 to 30% by weight of vanadium pentoxide and not more than 0.1% by weight of an alkali metal compound (calculated as sulfate), wherein specific surface area of the catalytically active component is at least 5 m^2/g.

4,879,388
EXTRACTION OF METAL VALUES

Peter M. Quan, Rochdale; David Stewart, Royton, and Anthony J. Nelson, Middleton, all of England, assignors to Imperial Chemical Industries, PLC, London, England

Continuation of Ser. No. 912,660, Sep. 29, 1986, abandoned, which is a continuation of Ser. No. 663,696, Oct. 22, 1984, abandoned. This application Feb. 29, 1988, Ser. No. 165,350

Claims priority, application United Kingdom, Nov. 17, 1983, 8330715

Int. Cl.[4] C07D *249/08*

U.S. Cl. 548—262 9 Claims

1. A process for extracting copper values from aqueous solutions of metal salts containing halide or pseudo halide anions which comprises contacting the aqueous solution with a solution in a water-immiscible organic solvent of a 1-substituted-1,2,4-triazole of the formula:

where R is: (1) a hydrocarbyl group, R_1, containing from 9 to 36 carbon atoms; or (2) a group of the formula:

$$-(X)_n-(CO-Y)_m$$

wherein X is (i) a methylene linking group wherein one or both H atoms are optionally replaced by a halogen atom, cyano group, nitro group or lower alkyl group, or (ii) a vinylene linking group $R_4-C=C-R_5$ wherein R_4 and R_5 are separately hydrogen or a halogen atom, cyano group, nitro group or lower alkyl group or the group CO—Y, or (III) a phenylene group optionally substituted by a halogen atom, or (iv) a linking group of the formula:

where

A is an ortho phenylene linking group, optionally substituted by one or more halogen atoms, a cyano group, a nitro group or a lower alkyl group, and

n is 1 or 0; and wherein

Y is OR_2 or R_3 where R_2 and R_3 are hydrocarbyl groups containing from 9 to 36 carbon atoms and m is from 1 to 3.

4,879,389
CHIRAL PHOSPHINOPYRROLIDINE COMPOUNDS AND THEIR USE FOR ASYMMETRIC SYNTHESIS OF OPTICALLY ACTIVE COMPOUNDS

Kazuo Achiwa, 11-17, Kamiashiarai 2-chome, Shizuoka-shi, Shizuoka-ken, Japan

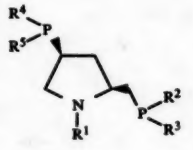
Filed Jun. 25, 1987, Ser. No. 66,251

Claims priority, application Japan, Jun. 25, 1986, 61-147167; Mar. 9, 1987, 62-52177; Mar. 9, 1987, 62-52178

Int. Cl.[4] C07F *9/65, 7/18;* C07B *53/00;* B01J *31/02*

U.S. Cl. 548—412 6 Claims

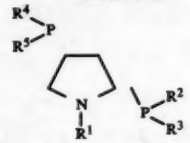
1. Chiral phosphinopyrrolidine compounds of the formula:



(I)

or

-continued



(I')

wherein R^1 is a hydrogen atom, —COR, —COOR, —CONHR or $—SO_2—R$ where R is an alkyl or aryl group, R^2 and R^3 each represent independently, phenyl, napthyl, furyl, thienyl, pyrrolyl, pyridyl, pyrazinyl, pyrimidyl, pyridazinyl, quinolyl or isoquinolyl, which may be substituted with one or more halogen atoms, hydroxyl, alkyl or alkoxyl groups; and R^4 and R^5 represent, independently C_1–C_8 straight chain or branched chain alkyl, alkenyl or alkynyl groups which may be substituted with one or more halogen atoms, hydroxyl or alkoxy groups; and C_5–C_8 cycloalkyl, cycloalkenyl or cycloalkynyl, which may be substituted with one or more halogen atoms, hydroxyl, alkyl or alkoxy groups.

4,879,390
DELTA-BUTYROLACTAMS, THEREOF, PROCESSES FOR THE PREPARATION THEREOF AND THEIR MEDICAL USE

Yen-rong Chen; Ming-he Yang; Liang Huang; Geng-tao Liu, all of Beijing, China, and Ulrich Benz, Duesseldorf, Fed. Rep. of Germany, assignors to Chinese Academy of Medical Sciences, Beijing, China and Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

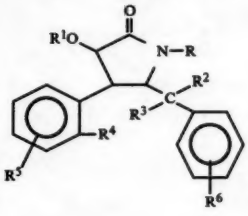
Continuation of Ser. No. 769,097, Aug. 26, 1985, abandoned. This application Apr. 27, 1988, Ser. No. 186,540

Claims priority, application Fed. Rep. of Germany, Aug. 24, 1984, 3431257

Int. Cl.[4] C07D *207/38, 491/08*

U.S. Cl. 548—453 9 Claims

1. A compound of the formula



wherein

R is an alkyl, aryl or aralkyl group having from 1 to 10 carbon atoms;

R^1 represents an alkyl, aryl or aralkyl group having from 1 to 10 carbon atoms, a carboxylic acid acyl group having from 1 to 18 carbon atoms or together with R^3 represents a chemical bond;

R^2 represents hydrogen or together with R^3 represents oxygen;

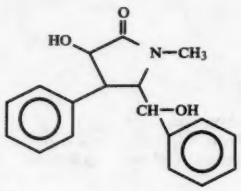
R^3 represents hydrogen, hydroxy, an alkoxy, aryloxy or aralkyloxy group having from 1 to 10 carbon atoms, an acyloxy group having from 1 to 18 carbon atoms, together with R^1 or R^4 *l represents a chemical bond or together with R2* represents oxygen;

R^4 is hydrogen, together with R^3 represents a chemical bond or has the meaning of R^5; and

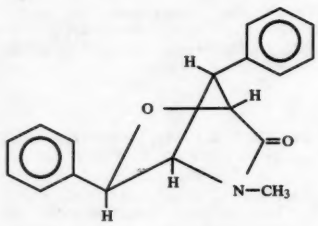
R^5 and R^6 which are the same or different, represent hydrogen, an alkyl, aryl or aralkyl group having from 1 to 10 carbon atoms, an alkoxy, aryloxy or aralkoxy group having from 1 to 10 carbon atoms, a carboxylic acid acyl group having from 1 to 18 carbon atoms, CF_3, OCF_3, nitro, hydroxy, halogen, amino, dialkylamino having from 1 to 4 carbon

atoms in the alkyl groups, carboxy, SO_3H or carboxylic acid acylamino having 1 to 18 carbon atoms.

6. A substantially pure stereoisomer of the formula



9. The substantially pure compound of the formula



4,879,391

1-PHENYL-2(1H,3H)-INDOLONE PSYCHOTHERAPEUTIC AGENTS

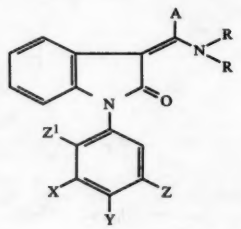
Harry R. Howard, Jr., Bristol, and Reinhard Sarges, Mystic, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 641,071, Aug. 15, 1984, which is a division of Ser. No. 420,544, Sep. 20, 1982, Pat. No. 4,476,307. This application Aug. 3, 1987, Ser. No. 81,262

Int. Cl.[4] C07D *209/34*

U.S. Cl. 548—486 **31 Claims**

1. A compound of the formula



wherein:

A is hydrogen or methyl;

R is hydrogen, methyl or ethyl;

X is hydrogen, $(C_1–C_2)$alkyl; $(C_1–C_2)$alkkoxy, $(C_1–C_2)$alkylthio; chloro, fluoro or trifluoromethyl;

Y is hydrogen, $(C_1–C_2≦)$*alkyl*, $(C1–C_2)$alkoxy or $(C_1–C_2)$alkylthio; and

Z and Z^1 are each independently hydrogen or methyl; with the provisos that:

at least one of X, Y, Z and Z^1 is other than hydrogen;

at least one of X and Y is other than $(C_1–C_2)$alkoxy; and

when R is methyl, A is also methyl.

4,879,392

PROCESS FOR MAKING PERHYDROINDOLE-2-CARBONXYLIC ACID

Francis Brion, Gagny; Jean Buendia, Le Perreux sur Marne, and Christian Marie, Noisy le Sec, all of France, assignors to Roussel Uclaf, Paris, France

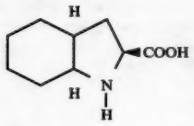
Filed Oct. 21, 1987, Ser. No. 111,982

Claims priority, application France, Oct. 22, 1986, 86 14650

Int. Cl.[4] C07D *209/18*

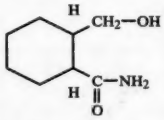
U.S. Cl. 548—492 **7 Claims**

1. A process for the asymmetric preparation of a compound of the formula



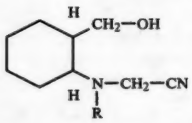
I

wherein the hydrogens at 3a and 7a are of cis or trans configuration and their non-toxic, pharmaceutically acceptable acid addition salts consisting essentially of submitting a compound of the formula



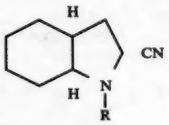
II

to a Hoffman reaction and reacting the resulting product with formaldehyde, cyanide ions and an acid chloride, bromide or iodide of benzoic acid or an alkyl carboxylic acid of 1 to 5 carbon atoms to obtain a compound of the formula



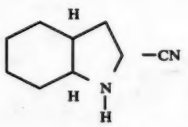
III

wherein R is acyl of benzoic acid or alkyl carboxylic acid of 1 to 5 carbon atoms, cyclizing the latter to form a compound of the formula



IV

selectively hydrolyzing the latter with a dilute aqueous mineral acid to obtain a compound of the formula



IV'

and subjecting the latter to hydrolysis with a concentrated aqueous mineral acid to form the acid addition salt of a compound of Formula I.

4,879,393

4-BENZYLOXY-3-PYRROLIN-2-ON-1-YL ACETAMIDE PRODUCTION

Thomas Meul, Visp, Switzerland, assignor to Lonza Ltd., Gampel/Valais, Switzerland

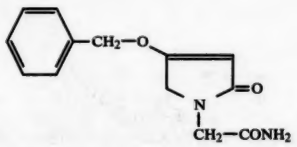
Division of Ser. No. 60,262, Jun. 10, 1987. This application Apr. 14, 1988, Ser. No. 181,710

Claims priority, application Switzerland, Jun. 26, 1986, 2567/86

Int. Cl.[4] C07D *207/38*

U.S. Cl. 548—544 16 Claims

1. Process for the production of 4-benzyloxy-3-pyrrolin-2-on-1-yl acetamide of the formula:



comprising converting a 4-(C_1-C_2) alkoxy-3-pyrrolin-2-on-1-yl acetic acid (C_1-C_4) alkyl ester with benzyl alcohol in the presence of an acid to 4-benzyloxy-3-pyrrolin-2-on-1-yl acetic acid benzyl ester, and converting said 4-benzyloxy-3-pyrrolin-2-on-1-yl acetic acid benzyl ester with ammonia to said 4-benzyloxy-3-pyrrolin-2-on-1-yl acetamide.

4,879,394

REACTION OF OLEFINS WITH MALEIC ANHYDRIDE

Herbert E. Fried, and Charles L. Edwards, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 120,255, Nov. 13, 1987, abandoned. This application May 4, 1988, Ser. No. 190,283

Int. Cl.[4] C07D *307/60*

U.S. Cl. 549—255 4 Claims

1. In a process for the reaction of olefinically unsaturated hydrocarbons with maleic anhydride to form the corresponding alkenyl succinic anhydride in the presence of an additive which reduces the formation of black solids and improves product color, the improvement which comprises utilizing a dialkyl zinc as additive.

4,879,395

VITAMIN E INTERMEDIATE

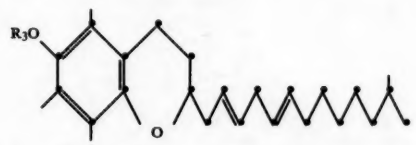
David L. Coffen, Glen Ridge, N.J.; Rudolf Schmid, Munchenstein/BL, Switzerland, and Mark J. Sebastian, Plainfield, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 30,798, Mar. 27, 1987, Pat. No. 4,789,750. This application Sep. 9, 1988, Ser. No. 242,382

Int. Cl.[4] C07D *311/72*

U.S. Cl. 549—408 2 Claims

1. A compound of the formula:



wherein the dotted bond forms a double bond or is hydrogenated to form a single bond; and R_3 taken together with its attached oxygen atom forms an ether hydroxy protecting group.

4,879,396

SELECTIVE EXTRACTION OF CO_2 AND ARGON FROM ETHYLENE OXIDE RECYCLE SYSTEM

Brian J. Ozero, New York, N.Y., assignor to Scientific Design Company, Inc., Little Ferry, N.J.

Continuation of Ser. No. 729,340, May 1, 1985, abandoned. This application Mar. 6, 1987, Ser. No. 22,498

Int. Cl.[4] C07D *301/10*

U.S. Cl. 549—534 1 Claim

1. In a process for the production of ethylene oxide which comprises:

(a) feeding an ethylene containing stream and an oxygen feed containing 75 to 95 mole % oxygen to a reaction zone;

(b) reacting as a gas mixture comprising 5–30 mole % ethylene and 5–9 mole % molecular oxygen in the presence of 1 to 25 mole % argon, 5 to 25 mole % CO_2, 0.2 to 1.0 mole % H_2O and 25 to 70 mole % combined CH_4 and N_2 in a reaction zone at temperatures of 150° to 450° C. and pressures of 150–350 psia over a silver catalyst;

(c) removing product ethylene oxide from the reaction gas mixture and;

(d) recycling a portion of the ethylene oxide depleted stream back to (a) wherein the improvement comprises:

(e) passing 50 to 100% of the reaction gas mixture after ethylene oxide removal to the shell side of a semipermeable membrane separation unit which efficiently and selectively extracts both CO_2 and argon and in which a 20 to 400 psi pressure differential is maintained between membrane sides, said selective extraction of CO_2 being substantially equal to the amount of CO_2 formed in said zone and said selective extraction of argon being substantially equal to the amount of argon entering said reaction zone in said oxygen feed;

(f) separating a permeate stream comprising about 0.3 to 3.0 of the stream fed to the semipermeable membrane separation unit, said permeate stream being enriched in CO_2 and argon and containing:

(i) an amount of CO_2 equal to 3–25% of the CO_2 in the stream fed to said semipermeable membrane separation unit and substantially equal to the CO_2 formed in said reaction unit; and

(ii) an amount of argon equal to 0.4–4.0% of the argon in the stream fed to said semipermeable membrane separation unit and substantially equal to the amount of argon entering said reaction zone in said oxygen feed; and

(g) recovering a non permeate stream depleted in CO_2 and argon and

(h) combining said non permeate stream of (g) with that portion of said reaction gas mixture, which after ethylene oxide removal is not passed to said semipermeable membrane separation unit to provide the recycle of (d).

4,879,397

NOVEL GALLIUM ARSENIDE PRECURSOR AND LOW TEMPERATURE METHOD OF PREPARING GALLIUM ARSENIDE THEREFROM

Klaus H. Theopold, and Erin K. Byrne, both of Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Nov. 3, 1987, Ser. No. 116,212

Int. Cl.[4] C07F *7/02*

U.S. Cl. 556—11 6 Claims

1. Arsinogallane compound having the formula $R_2Ga\text{-}As(SiR'_3)_2$ wherein R is selected from the group consisting of a cycloaliphatic group, an alkyl substituted cycloaliphatic group and an alkyl substituted aromatic group and R' is alkyl.

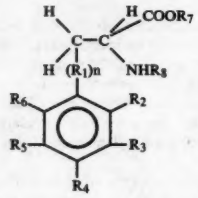
4,879,398

PROCESS FOR PRODUCING 2,6-DISUBSTITUTED TYROSINE

Daniel P. Getman, St. Louis; Roy A. Periana, St. Peters, and Dennis P. Riley, St. Louis, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 31, 1987, Ser. No. 139,999
Int. Cl.[4] C07F 7/10
U.S. Cl. 556—413 12 Claims

1. A process for the production of predominantly one enantiomorph of a 2,6-disubstituted phenyl amino acid of the structure:



wherein

R_1 is methylene or ethylene, n is 1 or 1,

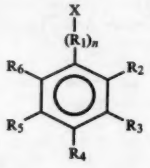
R_2 and R_6 are independently alkyl, aryl, chloro, fluoro, alkoxy, carboalkoxy or nitro and

R_3, R_4 and R_5 are independently hydrogen, alkyl, aryl, chloro, fluoro, alkoxy, carboalkoxy or nitro,

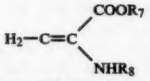
R_7 is an acid-protecting group and

R_8 is an amine-protecting group, comprising:

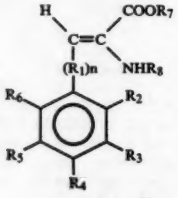
(1) coupling a substituted phenyl compound of the structure:



wherein X is bromo, iodo, or diazonium, with an acylamino acrylate of the structure:



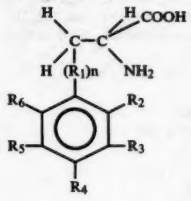
to form a substituted Z-3-(disubstituted phenyl) amino-protected acrylate of the structure:



and

(2) asymmetrically hydrogenating the acrylate obtained to form the desired enantiomorph of the 2,6-disubstituted phenyl amino acid.

11. A process for the production of predominantly one enantiomorph of a 2,6-disubstituted phenyl amino acid of the structure:



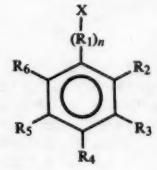
wherein

R_1 is methylene or ethylene, n is 0 or 1,

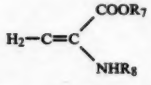
R_2 and R_4 are independently alkyl, aryl, chloro, fluoro, alkoxy, carboalkoxy or nitro and

R_3, R_4 and R_5 are independently hydrogen, alkyl, aryl, chloro, fluoro, alkoxy, carboalkoxy or nitro, comprising

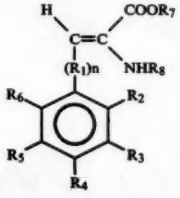
(1) coupling a substituted phenyl compound of the structure:



wherein X is bromo, iodo, or diazonium and n is 0 or 1, with an acylamino acrylate of the structure:



wherein R_7 is an acid-protecting group and R_8 is an amino-protecting group, to form a substituted Z-3(disubstituted phenyl) amino-protected acrylate of the structure:



(2) asymmetrically hydrogenating the acrylate obtained to form the desired enantiomorph of the 2,6disubstituted phenyl amino acid,

(3) deprotecting the protected 2,6 disubstituted phenyl amino acid.

4,879,399
ETHER SULFATES OF A MIXTURE OF BRANCHED 1-DECANOLS

Anthony Latella, Flanders, N.J., and Robert V. Casciani, Matthews, N.C., assignors to Sandoz Ltd., Basel, Switzerland

Continuation of Ser. No. 74,633, Jul. 17, 1987, abandoned, which is a continuation of Ser. No. 819,181, Jan. 15, 1986, abandoned. This application Jul. 29, 1988, Ser. No. 226,266

Int. Cl.[4] C07C *141/02*

U.S. Cl. 558—34 **9 Claims**

1. A compound of formula I,

$$R(OC_3H_6)_m(OC_2H_4)_nOSO_3M \quad \text{I}$$

wherein

R is the residue of a mixture of primary, aliphatic alcohols, at least 70 mol % of which is branched 1-decanols, the remaining components consisting essentially of primary, aliphatic alcohols having an average of 8 to 12 carbon atoms;

m is an integer 2 to 13;

n is an integer 6 to 15;

and M is a cation;

or a mixture of said compounds.

4,879,400
PROCESS FOR PRODUCING ALPHA-(BENZYLIDENE)ACETONYLPHOSPHONATES

Kiyotomo Seto; Hiroo Matsumoto, and Ryozo Sakoda, all of Funabashi, Japan, assignors to Nissan Chemical Industries Ltd., Tokyo, Japan

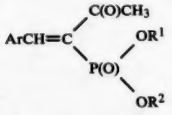
Filed Jan. 19, 1988, Ser. No. 145,042

Claims priority, application Japan, Jan. 21, 1987, 62-011752

Int. Cl.[4] C07F *9/21*

U.S. Cl. 558—83 **7 Claims**

1. A process for producing an α-(benzylidene)acetonylphosphonate of the formula:

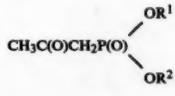


wherein Ar is a phenyl group substituted by at least one substituent selected from the group consisting of fluorine, chlorine, bromine, nitro, chloromethyl, dichloromethyl, trichloromethyl, trifluoromethyl, $—CO_2R^7$ wherein R^7 is C_1–C_5 alkyl, $—CONR^7R^8$ wherein R^7 is as defined above and R^8 is C_1–C_5 alkyl, $—C(O)R^7$ wherein R^7 is as defined above, $—OC(O)R^7$ wherein R^7 is as defined above, $—OSO_3R^7$ wherein R^7 is as defined above, $—OCF_3$, $—S(=O)_2R^7$ wherein R^7 is as defined above, —CN and $—SO_3R^7$ wherein R^7 is as defined above, and each or R^1 and R^2, which are the same or different, is a saturated or unsaturated C_1–C_{12} aliphatic group, or R^1 and R^2 together form 1,2-ethylene, 1,3-propylene or 1,4-butylene, which is unsubstituted or substituted by from one to four C_1–C_3 alkyl groups, which comprises:

(a) reacting an aldehyde of the formula:

$$ArCHO \quad \text{(I)}$$

wherein Ar is as defined above, with an acetonylphosphonate of the formula:



(II)

wherein R^1 and R^2 are as defined above, in the presence of a secondary amine of the formula:

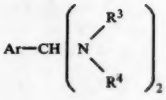
(IV)

wherein each of R^3 and R^4, which are the same or different, is C_1–C_4 alkyl, or R_3 and R_4 together form 1,4-butylene or 1,5-pentylene, which is unsubstituted or substituted by from one to four C_1–C_2 alkyl groups, $—CH_2CH_2OCH_2CH_2—$ or $—CH_2CH_2NHCH_2CH_2—$, and an α-halogeno fatty acid of the formula:

(V)

wherein X is fluorine, chlorine, bromine or iodine, and each of R^5 and R^6, which are the same or different, is hydrogen, fluorine, chlorine, bromine, iodine or C_1–C_4 alkyl; or

(b) reacting a compound of the formula:



wherein Ar, R^1 and R^2 are as defined above, with an acetonylphosphonate of the formula II as defined above, in the presence of an α-halogeno fatty acid of the formula V as defined above, and wherein the compounds of the formulas I, II, IV, V and VI are reacted in the following molar ratios: I:II:IV:V being 0.8–1.2:0.8–1.2:0.01–2.4:0.01–2.4; and II:V:VI being 0.8–1.2:1–.6–2.4:0.8–1.2; and further wherein said reactions are conducted in a temperature range of about 0° to 100° C.

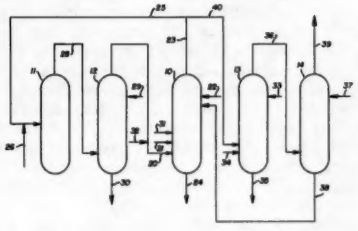
4,879,401
PROCESS FOR REMOVAL OF IMPURITIES IN ALKYL NITRITE FORMATION

Arthur R. Doumaux, Jr., Charleston, and James R. Nelson, S. Charleston, both of W. Va., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Sep. 29, 1987, Ser. No. 102,370

Int. Cl.[4] C07C *77/00*

U.S. Cl. 558—488 **25 Claims**



1. A process for removing impurities from the gaseous product stream of an alkyl nitrite production zone comprising:

(a) contacting at least a portion of the gaseous product stream containing nitric oxide, alkyl nitrite and impurities recovered from an alkyl nitrite production zone, a lower

alcohol and oxygen in a reaction zone to produce a recovery stream substantially free of nitric oxide, said oxygen being present in said reaction zone in an amount such that the mole ratio of nitric oxide to oxygen in said reaction zone is in the range of from about 4:1 to about 2:1 and said lower alcohol being present in said reaction zone in an amount such that the mole ratio of nitric oxide to lower alcohol is about 1:1 or less;

(b) withdrawing said recovery stream from said reaction zone, said recovery stream containing alkyl nitrite and impurities and being substantially free of nitric oxide;

(c) removing at least a portion of the alkyl nitrite from said recovery stream; and

(d) purging at least a portion of said recovery stream from which the alkyl nitrite has been removed.

4,879,402

(METHYL)ACRYLIC ACID DERIVATIVES CONTAINING URETHANE GROUPS

Jürgen Reiners, Leverkusen; Wolfgang Podszun; Jens Winkel, both of Cologne; Carlhans Süling, Odenthal, and Gerhard Klein, Monheim, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

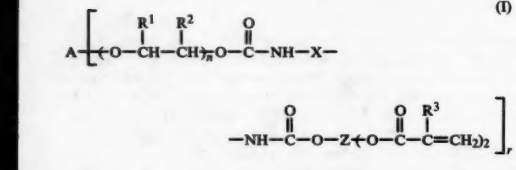
Filed Jul. 10, 1987, Ser. No. 72,467

Claims priority, application Fed. Rep. of Germany, Jul. 25, 1986, 3625202; Feb. 3, 1987, 3703130

Int. Cl.[4] C07C *125/04*

U.S. Cl. 560—26 **6 Claims**

1. A (meth)acrylic acid derivative, containing urethane groups, of the formula



(I)

wherein

A is a straight-chain or branched aliphatic radical having 2 to 20 carbon atoms in a carbon chain and optionally containing 1 to 3 oxygen bridges, an aromatic radical having 6 to 24 carbon atoms, an araliphatic radical having 7 to 26 carbon atoms or a cycloaliphatic radical having 6 to 26 carbon atoms,

r represents the number of chains starting from A and denotes a number from 2 to 6,

R^1 and R^2 are identical and denote hydrogen or are different and denote hydrogen and methyl, n denotes a number from 0 to 5, independently for each chain starting from A,

X is a divalent, straight-chain or branched aliphatic radical having 2 to 24 carbon atoms in a carbon chain, an aromatic radical having 6 to 26 carbon atoms in a carbon chain, an araliphatic radical having 7 to 26 carbon atoms in a carbon chain or a monocycloaliphatic radical having 6 to 26 carbon atoms in a carbon chain, it being possible for the aliphatic, aromatic, araliphatic and/or monocycloaliphatic radicals to contain 1 or 2 oxygen bridges and for several of the alphatic, aromatic, araliphatic and/or monocycloaliphatic radicals to be linked via optionally substituted methylene groups,

Z denotes a trivalent, straight-chain or branched aliphatic hydrocarbon radical which has 3 to 15 carbon atoms in a carbon chain and can optionally contain 1 to 3 oxygen bridges and can optionally be substituted by 1 to 3 (meth-)acrylate radicals, and

R^3 denotes hydrogen or methyl, independently for each chain starting from A.

4,879,403

PROCESS FOR THE PREPARATION OF CIS, ENDO-2-AZABICYCLO-[3.3.0]-OCTANE-3-CARBOXYLIC ACIDS

Volker Teetz, Hofheim am Taunus; Rolf Geiger, Frankfurt am Main; Hansjörg Urbach, Kronberg/Taunus; Reinhard Becker, Wiesbaden, and Bernward Schölkens, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

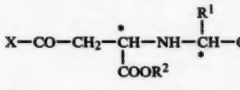
Continuation of Ser. No. 915,957, Oct. 3, 1986, abandoned, which is a continuation of Ser. No. 658,903, Oct. 9, 1984, abandoned, which is a division of Ser. No. 477,081, Mar. 21, 1983, abandoned, which is a continuation-in-part of Ser. No. 438,757, Nov. 3, 1982, abandoned. This application Nov. 2, 1988, Ser. No. 267,753

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1981, 3143946; Jul. 17, 1982, 3226768

Int. Cl.[4] C07C *101/10*

U.S. Cl. 560—38 **5 Claims**

1. A method for making a compound of the formula



wherein the chirality centers labelled with an asterisk both have the S-configuration and wherein

R^1 is methyl or 4-aminobutyl, which may be acylated;

R^2 is (C_1–C_6)-alkyl;

X is (C_1–C_6)-alkyl, (C_2–C_6)-alkenyl, (C_5–C_9)-cycloalkyl or (C_6–C_{12})-aryl, which can be mono-, di- or trisubstituted by (C_1–C_4)-alkyl, (C_1–C_4)-alkoxy, hydroxyl, halogen, nitro, amino, (C_1–C_4)-alkylamino, di-(C_1–C_4)-alkylamino, and/or by methylenedioxy, or

X is indol-3-yl; and

W′ is an esterifying group removable by hydrogenolysis, which method comprises reacting an S-alpha-aminoacid ester of the formula

$$H_2N—C^*H(R^1)—CO_2W'$$

with a keto-acrylic acid ester of the formula

$$X—CO—CH=CH—COOR^2$$

to give a reaction product predominantly containing the desired compound and then isolating the desired compound from said reaction product by crystallization.

4,879,404

NOVEL SALICYLATES, THEIR SALTS, PHARMACEUTICAL COMPOSITIONS CONTAINING THEM AND PROCESS FOR PREPARING SAME

János Fischer; László Dobay; Mihály Major; Elemér Ezer; Judit Matuz; Katalin Sághy; György Hajós, and László Szporny, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt, Budapest, Hungary

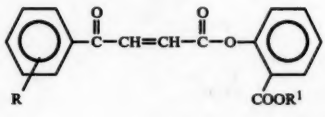
Filed Sep. 26, 1988, Ser. No. 248,970

Claims priority, application Hungary, Sep. 25, 1987, 4303/87

Int. Cl.[4] C07C *69/76*

U.S. Cl. 560—051 **11 Claims**

1. A 4-Oxo-4-(substituted phenyl)butenoyl-salicylate of the formula (I),



(I)

wherein

R stands for hydrogen, halogen, C_{1-4}alkyl, C_{1-4}alkoxy or a C_{1-4}acylamino group;; and

A^1 is hydrogen or a carboxyl-protective group of E and/or Z configuratio or a salt thereof.

4,879,405

PREPARATION OF PENTENOIC ESTERS

Fritz Naeumann, Mannheim; Wolfgang Hoelderich, and Franz Merger, both of Frankenthal, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 10, 1988, Ser. No. 205,335

Int. Cl.[4] C07C *67/30, 67/343*

U.S. Cl. 560—211 11 Claims

1. A process for preparing a pentenoic ester, which comprises: heating a formylvaleric ester at from 50° to 400° C. in the presence of a zeolite or one or more phosphates selected from the group consisting of aluminum phosphate, silicon aluminum phosphate, boron aluminum phosphate, silicon iron aluminum phosphate, cerium phosphate, zirconium phosphate, boron phosphate, iron phosphate and strontium phosphate.

4,879,406

PREPARATION OF PENTENOIC ESTERS FROM FORMYLVALERIC ESTERS

Franz Merger, Frankenthal; Juergen Frank, Schwetzingen; Uwe Vagi, Speyer, and Rolf Fischer, Heidelberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 10, 1988, Ser. No. 205,354

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1987, 3719937

Int. Cl.[4] C07C *67/30, 67/343*

U.S. Cl. 560—211 13 Claims

1. A process for the preparation of a pentenoic ester which comprises: heating a 3- and/or 4-formylvaleric ester to 50°–400° C. in the presence of a catalyst which contains one or more elements of subgroup VIII of the Periodic Table.

4,879,407

PROCESS FOR THE PREPARATION OF ETHYL TRIFLUOROACETATE

Louis Amiet, Lyons, France, assignor to Rhone-Poulenc Chimie, Cedex, France

Filed Oct. 16, 1987, Ser. No. 109,052

Claims priority, application France, Oct. 16, 1986, 86 14606

Int. Cl.[4] C07C *69/63;* B01D *3/34*

U.S. Cl. 560—227 39 Claims

1. A process for the preparation of ethyl trifluoroacetate, comprising:

in a first stage, contacting trifluoroacetic acid with a slight excess of ethanol in the presence of concentrated sulfuric acid and a solvent for a time sufficient to achieve a first esterification, said solvent being present in an amount sufficient to solubilize trifluoroacetic acid and ethyl trifluoroacetate, having a boiling point higher than that of trifluoroacetic acid, and having a specific gravity less than 1 and which solvent does not form an azeotrope with ethyl trifluoroacetate and thereafter carrying out a phase separation and removing the resulting sulfuric layer;

in a second state, introducing an additional quantity of sulfuric acid and trifluoroacetic acid and reacting for a time sufficient to achieve a second esterification and then carrying out a phase separation and removing the resulting sulfuric layer; and

in a third stage, distilling the mixture obtained from the second stage to recover ethyl trifluoroacetate.

4,879,408

CYCLOALIPHATIC DIISOCYANATES OPTIONALLY IN THE FORM OF ISOMER MIXTURES AND A PROCESS FOR THEIR PRODUCTION

Hartmut Knöfel, Odenthal-Erberich; Michael Brockelt, Bergisch-Gladbach; Stefan Penninger, and Herbert Stutz, both of Dormagen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

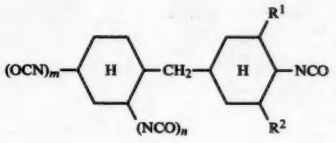
Continuation of Ser. No. 531,389, Sep. 12, 1983, abandoned. This application Apr. 7, 1987, Ser. No. 35,571

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1982, 3235573

Int. Cl.[4] C07C *69/00*

U.S. Cl. 560—330 5 Claims

1. A diisocyanate corresponding to the formula



in which

R_1 and R_2 may be the same or different and each radical represents hydrogen or a C_1–C_{12}-alkyl group, provided that at least one of the radicals R^1 and R^2 represents an alkyl radical, and

m and n each represent 0 or 1, provided that the sum of m+n is 1 and that when m or n represents 0, the free valency is saturated by hydrogen, and in which diisocyanate isomers may be present.

4,879,409

CYCLOALIPHATIC DIISOCYANATES, OPTIONALLY IN THE FORM OF ISOMERIC MIXTURES AND A PROCESS FOR THEIR PREPARATION

Hartmut Knöfel, Odenthal-Erberich; Michael Brockelt, Bergisch-Gladbach; Stefan Penninger, and Herbert Stutz, both of Dormagen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

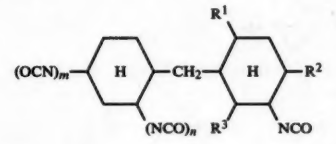
Continuation of Ser. No. 531,388, Sep. 12, 1983, abandoned. This application Apr. 7, 1987, Ser. No. 35,417

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1982, 3234996

Int. Cl.[4] C07C *69/00*

U.S. Cl. 560—330 5 Claims

1. A diisocyanate corresponding to the formula



in which

R^1, R^2 and R^3 may be the same or different with each radical representing hydrogen or a C_1–C_{12} alkyl group, provided that two of the radicals R^1, R^2 and R^3 represent hydrogen and the third radical represents an alkyl group, and

n and m each represent 0 or 1, provided that the sum of m+n equals 1 and when m or n=0, the free valency is saturated by hydrogen and in which C_1–C_{12}-monoalkyl-substituted methylene-bis-(cyclohexylisocyanate)-isomers may be present in the diisocyanate in an amount of up to 40 wt %.

4,879,410

PREPARATION OF PRIMARY ARALKYL URETHANES AND UREAS AND ISOCYANATES DERIVED THEREFROM

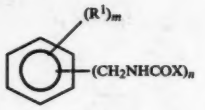
Balwant Singh, Stamford; Laurence W. Chang, New Haven, and William A. Henderson, Jr., Stamford, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Nov. 3, 1986, Ser. No. 926,070

Int. Cl.[4] C07C *119/00, 125/06, 127/01*

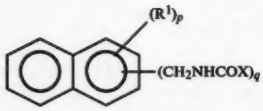
U.S. Cl. 560—344 **23 Claims**

1. A process for production of a urethane or urea selected from the formulae:



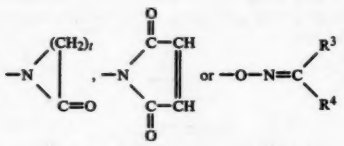
(I)

or



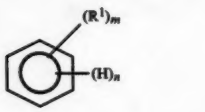
(II)

or a mixture of (I) and (II) wherein X is selected from —OR, $-NR^2_2$,



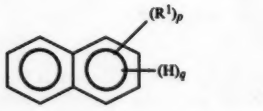
R is alkyl or hydroxy alkyl of from about 1 to about 6 carbon atoms, aryl of from about 6 to about 10 carbon atoms or aralkyl of from about 7 to about 10 carbon atoms, R^1 is hydrogen or alkyl of from about 1 to about 30 carbon atoms, R^2 is alkyl of from about 1 to 6 carbon atoms, R^3 is as defined for R^1, R^4 is as defined for R^2, and when taken together, R^3 and R^4, are $—CH_2(CH_2)_3CH_2—$ or $—CH_2(CH_2)_2CH_2—$, n is an integer of 1 to 2 and m is 6-n, q is an integer of 1 or 2 and p is 8-q, and t is an integer of from 2 to 6, said process comprising reacting

(a) an aromatic hydrocarbon of the formula



(III)

or



(IV)

wherein R^1, m, n, p and q are as above defined, with

(b) a carbamate of the formula

$H_2N—COX$

wherein X is as above defined; trioxymethylene, paraform, formcels and condensation products of (b) and the forementioned; and

(d) an effective catalytic amount of an acid catalyst at a temperature of from about 30° C. to about 150° C. until formation of said urethane or urea compound (I), (II), or a mixture thereof is substantially complete.

4,879,411

METHOD FOR RACEMIZATION OF OPTICALLY ACTIVE SERINE

Ken-ichi Ishiwata, Yokohama; Takeshi Nakamura, Zushi; Nobuyoshi Makiguchi, Fujisawa; Shoichiro Miyahara, Yokohama; Toshio Matsumoto, and Kazunari Nitta, both of Oomuta, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Jul. 18, 1988, Ser. No. 219,781

Claims priority, application Japan, Aug. 5, 1987, 62-194333

Int. Cl.[4] C07B *55/00*

U.S. Cl. 562—401 **9 Claims**

1. A method for racemizing optically active serine comprising treating the optically active serine in an alkaline aqueous solution in the presence of pyridoxal phosphate or salicylaldehyde and an alkaline compound.

4,879,412

PURIFICATION PROCESS OF METHACRYLIC ACID

Kozo Iwasaki, Yokohama; Morimasa Kuragano, Osaka; Minoru Koshibe, Osaka; Yoshihiro Sezaki, Osaka; Katsuji Yoguchi, Kitakanbara, and Yoshio Koyama, Osaka, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc. and Kyowa Gas Chemical Industry Co., Ltd., both of Toyko, Japan

Filed Mar. 3, 1986, Ser. No. 835,737

Claims priority, application Japan, Mar. 14, 1985, 60-49248; Apr. 10, 1985, 60-74351; Jun. 25, 1985, 60-136882

Int. Cl.[4] C07C *51/42*

U.S. Cl. 562—600 **4 Claims**

1. A process for the purification of a solution of methacrylic acid, said methacrylic acid being prepared by subjecting a compound selected from the group consisting of isobutylene, tertiary butanol, methacrolein and isobutyl aldehyde to catalytic oxidation with a molecular oxygen-containing gas in the presence of steam, which comprises;

extracting said solution of methacrylic acid containing maleic acid and citraconic acid with an organic solvent;

contacting said extract or methacrylic acid obtained by distilling the organic solvent from the extract, with a basic anion-exchange resin, thereby removing maleic acid and citraconic acid from said solution of methacrylic acid;

recovering citraconic acid by applying maleic acid as an eluent to the citraconic acid-maleic acid containing basic anion-exchange resin obtained from said contact step; and then

contacting the eluted resin obtained with a strong alkali, thereby eluting maleic acid from the resin and regenerating the resin for reutilization.

4,879,413

PROCESS FOR THE PREPARATION OF A SOLID ADDUCT OF SULFURIC ACID AND UREA

Hansjörg Buser, Marly, and Adolf Morand, Villars-sur-Glane, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 921,848, Oct. 23, 1986, abandoned, which is a continuation of Ser. No. 420,535, Sep. 20, 1982, abandoned, which is a division of Ser. No. 235,388, Feb. 17, 1981, Pat. No. 4,366,232. This application Sep. 12, 1988, Ser. No. 244,632

Claims priority, application Switzerland, Feb. 22, 1980, 1435/80

Int. Cl.[4] C07C *127/01*

U.S. Cl. 564—63 **4 Claims**

1. A process for the preparation of an adduct of sulfuric acid

and urea, with a urea/sulfuric acid ratio of 2:1 or 1:1, which comprises introducing the solid urea in the indicated ratio into a precisely 100% sulfuric acid (mono-hydrate), the rate at which the urea is introduced and the external cooling being so matched to one another that the temperature is between 70° and 100° C. during the mixing period, and converting the neutral or acid urea-sulfate thus obtained into the solid form by cooling.

4,879,414

POLYTHIOLS AND USE AS EPOXY RESIN CURING AGENTS

Grannis S. Johnson, Maplewood; Reuben H. Grinstein, Denville; Stuart J. Hartman, Livingston, and Raymond P. Dallago, Highland Park, all of N.J., assignors to Henkel Corporation, Ambler, Pa.

Filed Feb. 17, 1988, Ser. No. 156,692

Int. Cl.[4] C07C *87/28, 87/60;* **C08G** *59/66*

U.S. Cl. 564—388 **14 Claims**

1. Polythiols having the following structure: $(XSCH_2CHOHCH_2)_b$-A-R-N-$(CH_2CHOHCH_2SX)_2$, wherein R is a divalent hydrocarbon moiety selected from the group consisting of aromatic, substituted aromatic, cycloaliphatic, substituted cycloaliphatic, or aliphatic hydrocarbon moieties; A is N or O; X is —H or —R'SH, where R' is alkylene, cycloalkylene, or alkylene substituted aromatic; and when A is 0, b is 1 and when A is N, b is 2.

4,879,415

PROCESS FOR THE PREPARATION OF CHLORONITROANILINES AND CHLORONITROPHENOLS

Bernhard Albrecht, Buus, Switzerland, and Jürgen Beyrich, Huttingen, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 829,333, Feb. 14, 1986, abandoned. This application Nov. 25, 1987, Ser. No. 129,425

Claims priority, application Switzerland, Feb. 22, 1985, 827/85

Int. Cl.[4] C07C *85/24, 79/32*

U.S. Cl. 564—412 **9 Claims**

1. In a process for the preparation of a chloronitroaniline or chloronitrophenol by chlorinating a nitroaniline or nitrophenol in hydrochloric acid, wherein the improvement comprises comprises simultaneously adding to said hydrochloric acid separate streams of a nitroaniline or nitrophenol and of a chlorinating agent.

4,879,416

PREPARATION OF BIDENTATE LIGANDS

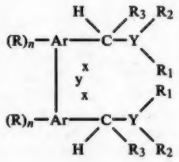
Thomas A. Puckette; Thomas J. Devon; Gerald W. Phillips, and Jerome L. Stavinoha, all of Longview, Tex., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 23, 1987, Ser. No. 123,407

Int. Cl.[4] C07F *9/02, 9/66*

U.S. Cl. 568—13 **21 Claims**

1. A process for preparing a bidentate ligand of the formula



wherein

each Ar is independently selected from aromatic ring compounds having 6 up to 14 carbon atoms;

the x bonds and the y bonds are attached to adjacent carbon atoms on the ring structures;

each R, when present as a substituent, is independently selected from alkyl, alkoxy, aryloxy, aryl, aralkyl, alkaryl, alkoxyalkyl, cycloaliphatic, halogen, alkanoyl, alkanoyloxy, alkoxycarbonyl, carboxyl, cyano or formyl radicals;

n is a whole number in the range of 0–4 where Ar is phenyl; 0–6 where Ar is naphthyl; and 0–8 where Ar is phenanthryl or anthracenyl;

each R_1 and R_2 is independently selected from alkyl, aryl, aralkyl, alkaryl or cycloaliphatic radicals or substituted derivatives thereof; wherein substituted derivatives thereof are selected from alkoxy, aryloxy, alkoxyalkyl, halogen, alkanoyl, alkanoyloxy, alkoxycarbonyl, cyano, carboxyl or formyl substituted compounds;

each R_3 is independently selected from hydrogen and the R_1 substituents;

each of the above alkyl groups or moieties is a straight or branched chain of 1–20 carbons; preferably 1–8 carbons;

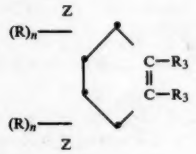
each aryl group contains 6–10 ring carbons;

each cycloaliphatic group contains from 4–8 ring carbons; and

each Y is independently selected from the elements N, P, As, Sb and Bi;

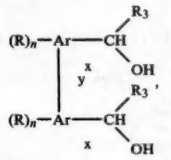
said process comprising the steps,

(1) contacting with ozone under ozonolysis conditions a suspension in a hydroxylic reaction medium of a reactant selected from phenanthrene or a phenanthrene derivative having the structure:

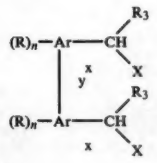


wherein each Z 4 through 12 carbon fragment completing a single aromatic ring or a fused ring system, respectively, to form an ozonated intermediate;

(2) contacting said ozonated intermediate with a reducing agent under conditions appropriate to form a diol having the structure:

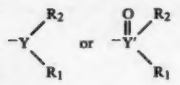


(3) contacting with diol with an activating agent comprising a latent displaceable functional group, X, under conditions sufficient to convert the diol to a difunctional biaryl compound having the structure:



wherein X is a functional group which can be displaced under nucleophilic substitution conditions,

(4) contacting said difunctional biaryl compound with an anion having the structure:



wherein Y' is selected from the group consisting of P, As, Sb and Bi;

in a molar ratio of anion to difunctional biaryl compound in the range of about **1/1** up to **20/1** under conditions appropriate to displace X and thereby form the above bidentate ligand or an oxygenated intermediate product thereof; and

(5) optionally reducing the oxygenated intermediate product when the oxy-anion,

is employed as the anion in step (4).

4,879,417

PROCESS FOR CARBONYLATION OF ALKENES TO KETONES

Eit Drent, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Jul. 25, 1988, Ser. No. 223,815

Claims priority, application United Kingdom, Aug. 3, 1987, 8718307

Int. Cl.[4] **C07C** *45/50*

U.S. Cl. 568—387 **17 Claims**

1. A process for the preparation of ketones which comprises carbonylating an alkene with carbon monoxide in the presence of a hydrogen source selected from the group consisting of hydrogen containing gas, water and mixtures thereof, and a catalyst system, containing a noble metal of the Group VIII of the Periodic Table of the Elements, wherein said catalyst system comprises:

component (a)—a ruthenium compound, and

component (b)—at least one acid selected from the group consisting of hydrohalogenic acids and carboxylic acids having a pKa value ≦3 (measured at 25° C. in aqueous solution),

wherein said carbonylation is carried out in a water miscible solvent, at a pressure in the range from about 20 bar to about 100 bar and at a temperature in the range of about 70° C. to about 200° C.

4,879,418

PROCESS FOR THE PREPARATION OF ALDEHYDES

Hanswilhelm Bach, Duisburg; Helmut Bahrmann, Hamminkeln-Brunen; Boy Cornils, Hofheim; Wilhelm Gick, Duisburg; Volker Heim, Oberhausen; Werner Konkol, Oberhausen, and Ernst Wiebus, Oberhausen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

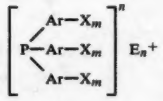
Filed Aug. 1, 1988, Ser. No. 226,768

Claims priority, application Fed. Rep. of Germany, Aug. 6, 1987, 3726128

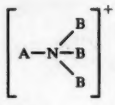
Int. Cl.[4] **C07C** *45/50*

U.S. Cl. 568—454 **36 Claims**

1. The process for the preparation of aldehydes comprising reacting at least one olefin of **2** to **20** carbon atoms with carbon monoxide and hydrogen in the liquid phase in the presence of water, a catalyst comprising rhodium in metallic form or as a compound and at least one water soluble phosphine of the formula



wherein each Ar is an aryl radical, X is a sulfonic acid group, and E is a mixture of an alkali metal ion or ammonium ion and a quaternary ammonium ion of the formula



wherein A is an alkyl of 6 to 20 carbon atoms and each B is individually an alkyl of 1 to 4 carbon atoms, each m is 0 or 1 and n is an integer from 2 to 3.

4,879,419

HYDROXYL-TERMINATED POLYEPICHLOROHYDRIN POLYMERS

Birger Johannessen, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 1, 1985, Ser. No. 750,910

Int. Cl.[4] **C07C** *43/12, 43/11;* **C08G** *65/24, 59/68*

U.S. Cl. 568—606 **11 Claims**

1. A polyepichlorohydrin product having a number average molecular weight of at least 2000 and a polydispersity of less than 1.2, said product comprising predominantly secondary hydroxyl-terminated polyepichlorohydrin polymer and essentially no non-hydroxyl functional cyclic ether oligomer, said product being made by polymerizing epichlorohydrin in the presence of anhydrous stannic chloride catalyst, a strong carboxylic acid co-catlyst, and an alcohol as an initiator.

4,879,420

PREPARATION OF MIXTURES OF BUTANEDIOLS

Richard E. Ernst, Kennett Square, Pa., assignor to E.I. du Pont de Nemours and Company, Wilmington, Del.

Filed May 6, 1988, Ser. No. 190,907

Int. Cl.[4] **C07C** *29/38, 31/20, 41/00;* **C07D** *307/02*

U.S. Cl. 568—617 **18 Claims**

7. A process for preparing a mixture of 1,4-butanediol and a 2-alkyl-1,4-butanediol comprising bringing together at an initial pH in the range between about 8 and 14, and a temperature and pressure effective for reaction:

(a) hydrogen,

(b) a hydrogenation catalyst,

(c) 4-hydroxybutyraldehyde, 2-hydroxytetrahydrofuran or a mixture of the same, and

(d) an aldehyde of the structure

R—CHO

wherein R is hydrogen or an alkyl radical containing 1 to 4 carbon atoms,

in a 4-hydroxybutyraldehyde/2-hydroxytetrahydrofuran: aldehyde weight ratio in the range between about 2:1 and 200:1.

11. In a process for preparing a mixture of tetrahydrofuran and 3-alkyltetrahydrofuran by cyclizing diols, the improvement comprising using as the diol starting material the mixture of 1,4-butanediol and 2-alkyl-1,4-butanediol prepared in accordance with the process of claim 7.

15. In a process for preparing a copolymer from a mixture of tetrahydrofuran and 3-alkyltetrahydrofuran, the improvement comprising adding a polymerization catalyst to the mixture of

tetrahydrofuran and 3-alkyltetrahydrofuran produced in accordance with the process of claim 11 and holding the resulting mixture under conditions effective for polymerization.

4,879,421

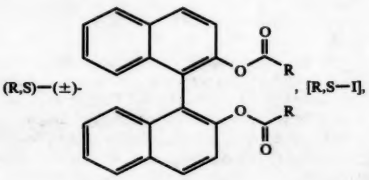
METHOD FOR PREPARING OPTICALLY ACTIVE BINAPHTHOL AND SPIROIBIINDANOL

Romas J. Kazlauskas, Montreal, Canada, assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 15, 1988, Ser. No. 232,248
Int. Cl.[4] C07C *39/38, 39/14*
U.S. Cl. 568—737 14 Claims

1. A method for preparing optically active (S)-(−)-1,1′-bi-2-naphthol, comprising the steps of

(a) reacting at a pH in the range of about 6 to about 8 an aqueous solution of pancreatic cholesterol esterase and an organic solution of an (R,S)-(+)-1,1′,-bi-2-naphthol-organic carboxylic acid diester represented by the formula:



the pancreatic cholesterol esterase being present in an amount, sufficient to effect asymmetric hydrolysis of (S)-(−)-1,1′-bi-2-naphthol-organic carboxylic acid diester contained in the diester of formula [R,S-I] and represented by the formula: t,0231

to produce a mixture comprising (S)-(−)-1,1′-bi-2-napthanol and (R)-(+)-1,1,′-bi-2-napthanol-organic carboxylic diester, and

(b) separating said binapthanol from said diester.

4,879,422

METHOD FOR PRODUCING CYCLOALKANOL

Tamio Shirafuji, and Kiyomi Sakai, both of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jun. 27, 1988, Ser. No. 211,881
Claims priority, application Japan, Jul. 7, 1987, 62-170027
Int. Cl.[4] C07C *29/04*
U.S. Cl. 568—835 11 Claims

1. A method for producing a cycloalkanol by hydrating a cycloalkene having 5–8 carbon atoms with water at a temperature in the range of 50°–200° C. in the presence of a catalyst obtained by ion-exchanging all or a part of the ion-exchangeable cations of a crystalline gallium silicate with hydrogen ions, said gallium silicate

(1) having the general formula, $xM_{n}O.Ga_2O_3.ySiO_2.zH_2O$ (wherein x represents a real number of from 0.7 to 1.1, M represents a cation, n represents 2/, y represents a real number of from 5 to 300, z represents a real number of from 0 to 200), and

(2) being characterized in that X-ray diffractometry thereof gives main peaks showing the following lattice spacings and relative intensities data,

Lattice spacing (Å)	Relative intensity (I/I_0)
11.1 ± 0.3	Strong
10.0 ± 0.3	Strong
3.85 ± 0.1	Strongest
3.75 ± 0.1	Strong
3.65 ± 0.1	Medium

4,879,423

2-CHLORO-3,6-DIFLUORO-BENZYL HALIDE

Michael J. Robson, Bracknell, England, assignor to Imperial Chemical Industries PLC, London, England

Division of Ser. No. 481,948, Apr. 4, 1983, Pat. No. 4,778,822.
This application Aug. 10, 1988, Ser. No. 230,368
Claims priority, application United Kingdom, May 21, 1982, 8214906
Int. Cl.[4] C07L *19/08*
U.S. Cl. 570—127 2 Claims

1. 2-chloro-3,6-difluorobenzyl halide.

4,879,424

CONVERSION OF ALKANES TO GASOLINE

Mohsen N. Harandi, Lawrenceville, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 19, 1988, Ser. No. 246,392
Int. Cl.[4] C07C *2/12*
U.S. Cl. 585—322 19 Claims

1. A process for converting an aliphatic hydrocarbon feedstream comprising paraffins to gasoline comprising the steps of:

(a) heating said feedstream in a first heat exchange unit;

(b) withdrawing said heated feedstream;

(c) adding said feedstream to a first reaction zone containing zeolite catalyst whereby said zeolite catalyst is at least partially deactivated;

(d) withdrawing an effluent from said first reaction zone comprising olefins, aromatics, and unreacted paraffins;

(e) withdrawing said partially deactivated zeolite catalyst from said first reaction zone;

(f) cooling said effluent in a second heat exchange unit;

(g) withdrawing said cooled effluent;

(h) adding said partially deactivated zeolite catalyst to a second reaction zone; and

(i) adding said cooled effluent to said second reaction zone containing partially deactivated zeolite catalyst particles, whereby at least a portion of olefins present in the effluent are oligomerized.

4,879,425

OLIGOMERIZATION OF OLEFINS

Simon G. Kukes, Naperville, Ill.; Robert L. Banks, and Jesse R. Harris, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 26, 1988, Ser. No. 198,947
Int. Cl.[4] C07C *2/10*
U.S. Cl. 585—350 14 Claims

1. A process for oligomerizing monolefins which comprises contacting

(a) a feed which comprises at least one monolefin containing 2 to 4 carbon atoms per molecule with

(b) a catalyst composition consisting essentially of a physical mixture of

(i) tungsten oxide being supported by a material consisting essentially of silica and

(ii) a pillared interlayered smectite clay;

under such contacting conditions as to obtain a product comprising at least one hydrocarbon which contains 5 to 12 carbon atoms per molecule.

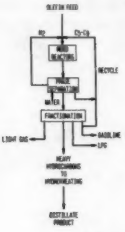
4,879,426
PALLADIUM-CATALYZED ARYLATION OF CYCLOALKENES
Richard C. Larock, and Bruce E. Baker, both of Ames, Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa
Filed May 9, 1988, Ser. No. 191,896
Int. Cl.[4] C07C 1/20
U.S. Cl. 585—469 16 Claims

1. A method of high yield arylation of cycloalkenes, comprising:
(a) reacting an aryl halide with a cycloalkene in the presence of a small but reaction promoting effective amount of a palladium(O) source or a palladium(II) ion source, and an alkali metal salt;
(b) said reaction occurring in a reaction yield enhancing polar organic solvent.

4,879,427
METHANE CONVERSION
John A. Sofranko, West Chester, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.
Filed Dec. 29, 1988, Ser. No. 291,701
Int. Cl.[4] C07C 2/00
U.S. Cl. 585—500 8 Claims

1. In a process for oxidative conversion of methane to higher hydrocarbons wherein a mixture of methane and gaseous oxidant is contacted at reaction conditions with a solid oxidative contact agent which is essentially free of reducible metal oxide, the improvement which comprises carrying out said contact of the presence of a chalcogen promoter.

4,879,428
UPGRADING LOWER OLEFINS
Mohsen N. Harandi, 12 Catbird Ct., Lawrenceville, N.J. 08648, and Hartley Owen, 5 Riverview Ter., Belle Mead,, N.J. 08502
Filed Mar. 3, 1988, Ser. No. 163,498
Int. Cl.[4] C07C 2/12
U.S. Cl. 585—533 13 Claims

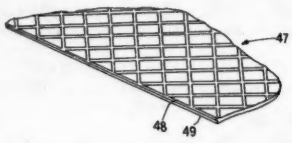


1. A continuous process for upgrading lower olefinic feedstock to higher hydrocarbons rich in C_{10}+distillate product, comprising:
contacting said feedstock with a shape selective medium pore oligomerization acid zeolite catalyst under rection conditions in a conversion zone at elevated temperature and pressure in the presence of hydrogen to convert olefins to heavier hydrocarbons;
recovering hot reaction effluent stream containing light gas, C_5–C_9 intermediate hydrocarbon and C_{10}+distillate hydrocarbons;
cooling said effluent stream to recover a liquid stream comprising C_5+hydrocarbons;
recycling a first portion of said liquid stream to said conversion zone;
fractionating a second portionof said liquid stream in a multistage distillation tower to recover a distillate hydrocarbon product stream comprising C_{10}+hydrocarbons and a light overhead gas stream;
recovering an overflash liquid stream rich in C_5–C_9 intermediate hydrocarbons from an upper stage of said distillation tower;
recycling said overflash liquid stream to said conversion zone in combination with said first portion of said liquid stream.

4,879,429
SOLID BASE, PROCESS FOR PREPARING THE SAME AND USE OF THE SAME IN PREPARATION OF INTERNAL OLEFINS
Gohfu Suzukamo, Ibaraki, and Masami Fukao, Shiga, both of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan
Division of Ser. No. 155,848, Feb. 16, 1988, Pat. No. 4,822,764. This application Jan. 31, 1989, Ser. No. 304,228
Claims priority, application Japan, Feb. 16, 1987, 62-32790; Feb. 16, 1987, 62-32791; Feb. 16, 1987, 62-32792; Feb. 16, 1987, 62-32793
Int. Cl.[4] C07C 5/25, 5/23
U.S. Cl. 585—670 21 Claims

1. A process for preparing an internal olefin comprising isomerizing an olefin in the presence of a catalyst comprising a solid base which is obtainable by reacting alumina with an alkali metal hydroxide and an alkali metal hydride or reacting water-containing alumina with an alkali metal hydride in an amount more than the molar equivalent of water contained in the water-containing alumina, at a temperature of 200° to 500° C. in an inert gas atmosphere.

4,879,430
PATTERNED ADHERENT FILM STRUCTURES AND PROCESS FOR MAKING
Kenneth Hoffman, Columbus, Ga., assignor to Plicon Corporation, Columbus, Ohio
Filed May 14, 1987, Ser. No. 50,057
Int. Cl.[4] B65B 53/00
U.S. Cl. 428—35.1 6 Claims

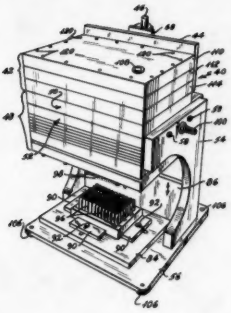


1. A web of plastic wherein one surface layer thereof has been subjected to patterned corona discharge treatment whereby the face of such surface layer has discontinuous pattern areas therein comprising corona discharge treated areas separated by untreated surface areas adjacent thereto and spacing the treated areas.

4,879,431
TUBELESS CELL HARVESTER
Joseph Bertoncini, Gaithersburg, Md., assignor to Biomedical Research and Development Laboratories, Inc., Gaithersburg, Md.
Filed Mar. 9, 1989, Ser. No. 323,607
Int. Cl.[4] C12M 1/12
U.S. Cl. 435—311 31 Claims

1. A multi layered cell harvester for removing, filtering and adding precise quantities of wash fluids or reagents comprising:

(a) a multi layered bottom section having a filter paper support layer;
(b) a multi layered top section having a manifold and means for positioning said multi layered top section with respect to said multi layered bottom section;
(c) a plurality of sample removal needles disposed in between one of the layers of said multi layered bottom section;
(d) a plurality of filtration channels disposed in said multi layered bottom section and in said multi layered top section connecting said plurality of sample removal needles with said manifold in said multi layered top section;



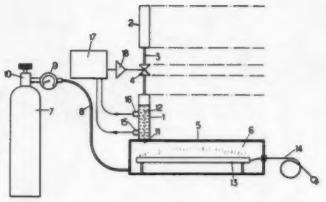
(e) a plurality of wash or reagent addition needles disposed in between one of the layers of said multi layered bottom section;
(f) a wash or reagent reservoir disposed in between one of the layers of said multi layered bottom section; and
(g) a plurality of wash or reagent addition channels connecting said reservoir with said plurality of wash or reagent needles and providing a substantially equal volume distribution of wash fluid or reagent to a plurality of test tubes by equalizing the length of each of said plurality of wash or reagent addition channels from the tip of each wash or reagent addition needle to said reservoir or by increasing the diameter of one or more of said wash or reagent addition channels or a combination thereof.

4,879,432

METHOD FOR MEASURING THE COAGULATION OF BLOOD PLASMA

Didier Vieillard, Polyclinique du Parc Route d'Assevent, 59600 Maubeuge, France

Continuation of Ser. No. 850,623, Apr. 11, 1986, abandoned. This application Nov. 30, 1988, Ser. No. 277,510
Claims priority, application France, Apr. 11, 1985, 85 05472
Int. Cl.[4] G01N *33/86*
U.S. Cl. 436—69 **5 Claims**



1. A method for measuring the coagulation time of blood plasma comprising the steps of:
(a) introducing the plasma and at least one reagent initiating coagulation of said plasma in a substantially vertical tube having an upper part while noting a reference time,
(b) introducing through the upper part of said tube into said plasma, solid particles having a high degree of wettability and having dimensions of about a few microns, for forming a continuous stream of said particles moving downwardly into said plasma,
(c) automatically detecting the occurrence of the instantaneous stop of downward motion of said particles in said plasma through optoelectronic means, said occurrence of said stop of downward motion indicating coagulation of said plasma, while noting the time of occurrence of said stop, and
(d) measuring the time difference between the reference time and the time of occurrence of said stop of downward motion of particles.

ELECTRICAL

4,879,433

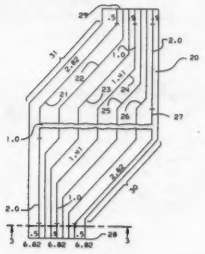
PARALLEL CABLE BUS WITH INTERNAL PATH LENGTH COMPENSATION

John B. Gillett, Woodstock; Fred H. Lohrey, Poughkeepsie, and Jerry A. Lorenzen, Stone Ridge, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 31, 1988, Ser. No. 265,064

Int. Cl.[4] H01B *7/08*

U.S. Cl. 174—32 **7 Claims**



1. A high performance flat cable comprising:

a plurality of conductors arranged parallel side-by-side in a common plane in a dielectric body;

said conductors within said body being relatively close at one of the remote ends and fanning out from said one end to provide more widely spaced parallel conductors; and

said conductors being of equal path lengths from said one end to an opposite end.

4,879,434

SUBASSEMBLY CASE INCLUDING A FLAT SHEET METAL SHIELD FASTENED WITH V-SHAPED SPRING CLIPS

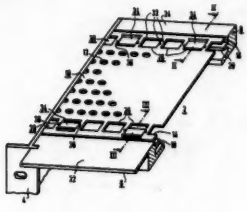
Eugen Assel, Knetzgau; Burkhard Dasbach, Steinbach, and Bruno Gebhard, Forchheim, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Oct. 11, 1988, Ser. No. 256,047

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 8714497

Int. Cl.[4] H05K *7/18, 9/00*

U.S. Cl. 174—35 R **4 Claims**



1. A subassembly case comprising: front and rear members having corresponding front and rear recessed shoulders; a flat sheet shield made of a conductive material and having a plurality of venting holes, and two bearing areas, each bearing area having a row of rectangular holes, each hole having a short side, said holes being arranged with said short sides being adjacent; and a plurality of V-shaped fastening spring clips made of a conductive material disposed in said rectangular holes, each spring clip having a leg terminating in a hook for engaging one of said recessed shoulders.

4,879,435

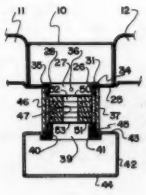
FITTING FOR THE UNDERSIDE OF A CELLULAR FLOOR

Charles N. Domigan, Coolville, Ohio, assignor to Butler Manufacturing Company, Kansas City, Mo.

Filed Aug. 9, 1988, Ser. No. 230,035

Int. Cl.[4] H02G *3/22*

U.S. Cl. 174—48 **10 Claims**



1. In combination, a floor and a fitting:

the floor including a raceway cell having a bore formed in the bottom thereof;

the fitting including;

a hollow cylindrical member, one end of which engages the bottom of said cell in alignment with said bore;

a junction box having a top wall with an opening and a bottom with a removable cover, the junction box being spaced from the bottom of said cell and the other end of said cylindrical member engaging the top wall of the junction in alignment with the opening in the top wall;

means engaging the inside of the bottom of said cell and engaging the underside of the top wall of said junction box to secure said cylindrical member and the junction box to said cell; and

fire-retarding means located between said removable cover and the bottom of said cell and arranged to permit passage of conductors.

4,879,436

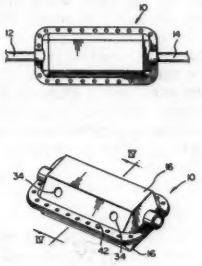
CLOSURE FOR TELECOMMUNICATIONS CABLE

R. Brian Braham, Saskatoon, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Aug. 18, 1988, Ser. No. 233,648

Int. Cl.[4] H02G *15/113*

U.S. Cl. 174—92 **7 Claims**



1. A closure structure for a telecommunications cable splice comprising two housing parts which are sealably connectable together, each housing part:

having a base;

a continuous outer wall extending from one side of the base to a free end of the outer wall; an inner wall disposed within the outer wall, the inner wall extending in a direc-

tion away from the base to a free end of the inner wall spaced inwardly from the free end of the outer wall; the inner wall providing a boundary for an inner chamber which is open at the free end of the inner wall, the base also forming a part of the said boundary;

the inner and outer walls also forming boundaries for an outer chamber which is open between the free ends of the inner and outer walls; and the free ends of the two walls defining recesses for receiving cables through the structure across the outer chamber and into the inner chamber; the two housing parts being securely connectable one to the other so that, except at the recesses in the free ends, the free ends of the inner walls of the two housing parts seal together to connect the inner chambers to define a splice chamber and the free ends of the outer walls of the two housing parts seal together to connect the outer chambers to define a sealant chamber for containing moisture blocking material, the recesses in the free end surfaces of the walls coacting in the assembly to provide cable entrance openings into the splice chamber through the sealant chamber.

4,879,437

MANUALLY CONTROLLED SWITCHING APPARATUS

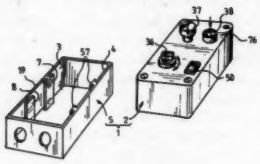
Pierre Dard, Le Pecq, and Fabrice Maës, Ermont, both of France, assignors to La Telemecanique Electrique, France

Filed Jan. 19, 1988, Ser. No. 144,977

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 8713155[U]

Int. Cl.[4] H01H *9/02*

U.S. Cl. 200—1 R **7 Claims**



1. A switching apparatus comprising:

i. a case having a base and a lid, said base having side walls and a bottom wall; said side walls having upper edges;

ii. at least one switching unit arranged in said base for providing a free space between said side walls and said switching unit;

iii. manual control members mounted on the lid and accessible from the outside of the case;

iv. the switching unit having actuating members controlled from said manual control members and housed on said base;

v. elongate slides formed in said side walls in a direction at right angles to said bottom wall and,

vi. support members forming elongate slide parts which slidingly cooperate with said elongate slides and supporting parts substantially parallel to said bottom wall, said actuating members being mounted on said supporting parts in said free space.

4,879,438

LOCK-ON/LOCK-OFF SWITCH FOR POWER TOOL

Charles D. Winchester, Easley, S.C., assignor to Ryobi Motor Products Corp., Pickens, S.C.

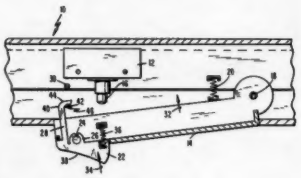
Filed Aug. 1, 1988, Ser. No. 226,578

Int. Cl.[4] H01H *9/06*

U.S. Cl. 200—61.85 **19 Claims**

1. In a switching apparatus for activating a driving motor of a motor driven device to operate the device, said device being mounted on a housing, said housing comprising blocking means, the switching apparatus including a switch for selectively closing and breaking an electrical path to provide and remove electric current to and from the motor, respectively, a manually operable power actuating lever for actuating an armature of the switch, and locking means for preventing operation of the actuating lever to actuate the armature of the switch to close the electrical path, the improvement comprising:

control means for controlling operation of said locking means, said control means operable for constraining movement of said locking means to be in a direction substantially parallel to a direction of movement of said actuating lever, said control means comprising trigger means engageable by a finger of the operator while engaging said



actuating lever to actuate the switch, said trigger means comprising cooperating means, said cooperating means comprising an abutment surface for abutting against said blocking means thereby to block movement of the actuating lever to prevent actuation of the armature of the switch; and

mounting means for mounting said control means to said actuating lever, said mounting means comprising pivot means for pivoting said control means about an axis substantially parallel to an operator engageable surface of said actuating lever to move said abutment surface away from said blocking means over the path of travel of said locking means.

4,879,439

APPARATUS FOR CONTROLLING START UP AND STOP DOWN OF A HYDRAULIC PUMP

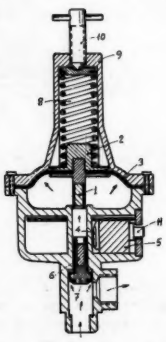
Fernando Banus Garcia, C. Sant Ramon, 6, 08230 Matadepera Barcelona, Spain

Filed Dec. 14, 1988, Ser. No. 284,075

Claims priority, application Spain, Dec. 18, 1987, 8800189

Int. Cl.[4] H01H *35/34*

U.S. Cl. 200—81.9 M **7 Claims**



1. Apparatus for controlling start up and stop down of a hydraulic pump, of the kind comprising a flow detector supplying, for a predetermined minimum value of flow, a start up signal for the pump, a pressure detector supplying, for a prede-

termined minimum value of the pressure, a start up signal for the pump, and impeller means for the pressure detector, characterized by the fact that the pressure detector comprises a movable part (1,2) which is integral with a membrane (3) closing a cavity (3b) communicating with the hydraulic network, and a fixed part (4,5) arranged in the apparatus body at the displacement position of the movable part (1,2), the impeller means for the movable part of the pressure detector are constituted of a spring (8) mounted between the said movable part (1,2) and the apparatus body (9), the flow detector comprising a part (6,7) which is movable in the vertical direction and performs the function of gravity closing valve, and a fixed part (4,5) which is arranged in the apparatus body.

4,879,440

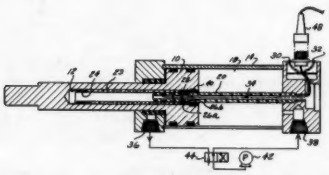
PROXIMITY SWITCH FOR A CYLINDER

Robert K. Lymburner, 4085 Clinton Dr., Clinton River Mobile Park, Mt. Clemens, Mich. 48043

Continuation-in-part of Ser. No. 141,552, Jan. 7, 1988, Pat. No. 4,803,318. This application Dec. 13, 1988, Ser. No. 283,818

Int. Cl.[4] H01H *35/38*

U.S. Cl. 200—82 R **18 Claims**



1. A proximity switch comprising:

a movable member traveling along a fixed path between a first position and a second position, said movable member having an aperture extending parallel to the fixed path from one end of the movable member toward another end of the movable member;

a housing enclosing a portion of the movable member to form a first expansible fluid chamber between a first end of the housing and the movable member, and forming a separate second expansible fluid chamber between a second end of the housing and the movable member, wherein expansion of the first fluid chamber drives the movable member to the first position and expansion of the second fluid chamber drives the movable member to the second position;

a sensor-supporting member connected to one end of the housing and extending parallel to the fixed path toward another end of the housing, said sensor-supporting member having a non-electrically conductive portion engaged within the aperture of the movable member;

separate fixed sensor means mounted on the non-electrically conductive portion of the sensor-supporting member said respective sensor means being electrically insulated from each other within said aperture; and

electrically conductive contact means within the aperture of the movable member and movable therewith to bridge the respective sensor means when in the first position.

4,879,441

DIELECTRIC BARRIER FOR A VACUUM INTERRUPTER

Sidney R. Hamm, Muskego, and Ronald A. Wainio, South Milwaukee, both of Wis., assignors to Cooper Industries, Inc.

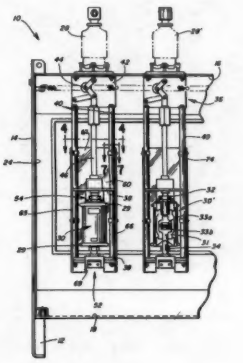
Filed Aug. 4, 1988, Ser. No. 228,338

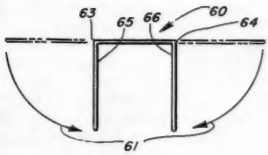
Int. Cl.[4] H01H *33/66*

U.S. Cl. 200—144 B **20 Claims**

1. With a high voltage interrupter of the type characterized by a container having at least one peripheral wall and an end wall, having therein a plurality of generally parallel vacuum switches which are spaced apart from each other and the walls of the container, having a mechanism which is carried by the end wall and which operates each vacuum switch, and having current exchange means for supplying electrical current from the end wall to the ends of each vacuum switch, each vacuum switch having a pair of cooperating oppositely disposed electrical contacts, one of the contacts being moved relative to the other contact by the mechanism and the other contact being electrically connected to the current exchange means by a conductor which disposed between the peripheral wall and the vacuum switch, apparatus comprising:

(a) stringer means, carried by the container, for carrying each vacuum switch at a spaced distance from the walls of the container, said stringer means comprising at least one





elongated stringer which is arranged generally parallel to the longitudinal axis of the vacuum switch and at a spaced distance from the vacuum switch; and

(b) an open dielectric barrier for at least one switch, said barrier being carried by said stringer at a spaced distance from the walls of the container and being spaced apart from and generally around said one vacuum switch, said barrier having a longitudinal dimension which is substantially greater than the longitudinal dimension of said one switch, having one generally flat smooth side which is disposed between said one switch and the other switch, having another generally flat smooth side which is disposed between said one switch and the current exchange conductor for said one switch, and having an open side for visual inspection of said one switch.

4,879,442

TISSUE CONTAINER AND WASTE TISSUE RECEPTACLE

Robert L. Giovine, 665 Bancroft Rd., Brick Town, N.J. 08723

Filed Aug. 22, 1988, Ser. No. 234,925

Int. Cl.[4] B65D *69/00*

U.S. Cl. 206—233 **1 Claim**

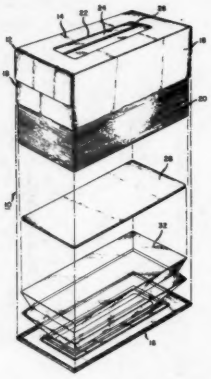
1. A receptacle for the selective removal of tissues and storage of soiled tissues comprising an enclosed container having opposing first and second surfaces with said opposing

surfaces being secured together by a circumferential sidewall, said first opposing surface having an aperture therethrough;

a movable partition disposed in said container, said movable partition substantially parallel to said first and second opposing surfaces;

a plurality of unused tissues disposed between said movable partition and said first opposing surface, said tissues selectively removable through said aperture of said first surface;

an expandable receptacle positioned between said movable partition and said second opposing surface, said expand-



able receptacle comprising a plastic envelope, said plastic envelope having a longitudinal aperture slit coincident with a longitudinal aperture positioned in said second opposing surface, said plastic envelope and said longitudinal aperture providing a deformable seal, for receipt of soiled tissues, said expandable plastic envelope, expanding to occupy the void left from the depletion of unused tissues, said soiled tissues being positioned within said expandable plastic bag receptacle, through said deformable seal, said soiled tissues thereby disposing said movable partition towards said first opposing surface for the further selective removal of unused tissues.

4,879,443

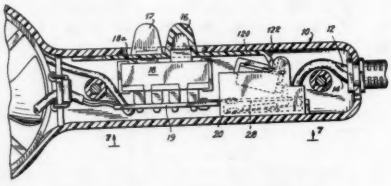
WATERPROOF SWITCH ASSEMBLY FOR ELECTRICAL APPLIANCES

Vito Carlucci, Stratford, and Raymond Kunz, Monroe, both of Conn., assignors to Clairol Incorporated, New York, N.Y.

Division of Ser. No. 84,585, Aug. 12, 1987, Pat. No. 4,751,485. This application Mar. 25, 1988, Ser. No. 173,701

Int. Cl.[4] H01H *9/06*

U.S. Cl. 200—293.1 **1 Claim**



1. In an electrical, hand-held appliance having a manually operated power on/off switch, said appliance operating on electrical power from a power source when said on/off switch is closed, the improvement comprising:

an auxiliary switch interposed between said power on/off switch and said power source,

an actuating means interconnecting said power switch and said auxiliary switch, said actuating means adapted to move in response to manual operation of said power switch and thereby operate said auxiliary switch, said actuating means comprising:

a cap adapted to mate with a movable part of said on/off switch; restraining means limiting the motion of said cap to one dimension; an extension member secured to one side of said cap; a cam projection secured to said extension member, said cam projection adapted to move said auxiliary switch between an on position in response to linear motion of said cap in one direction and an off position in response to linear motion of said cap in the opposite direction.

4,879,444

APPARATUS FOR THE HEAT TREATMENT OF INSULATING MATERIALS USING MICROWAVE ENERGY AND HOT GAS

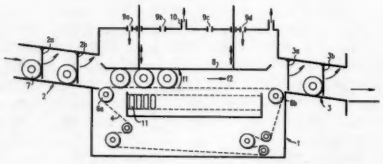
Bernard Bichot, Clermont, and Bernard Louis, Liancourt, both of France, assignors to Isover Saint-Gobain, Courbevoie, France

Division of Ser. No. 173,043, Mar. 28, 1988, which is a continuation of Ser. No. 943,827, Dec. 17, 1986, abandoned, which is a continuation of Ser. No. 628,266, Jul. 6, 1984, abandoned. This application Aug. 4, 1988, Ser. No. 210,084

Claims priority, application France, Jul. 8, 1983, 8311401

Int. Cl.[4] H05B *6/78*

U.S. Cl. 219—10.55 A **8 Claims**



1. Apparatus for the heat treatment of products based on mineral fibres containing a binder in solution in water, capable of being hardened by reactions of polymerisation and/or polycondensation, comprising:

a metal container impervious to microwaves and equipped with a conveyor device for conveying the products through said container, said products comprising discrete objects having a substantially circular cross section;

at least one source of ultra-high frequency microwave radiation directed in a direction towards the objects;

a source of hot gas which gas is directed to the surface of the objects, the conveyor device comprising, means for rolling said objects substantially without sliding about an axis forming an angle other than zero with the direction of the microwaves,

wherein the conveyor device and means for rolling comprise, in combination, a movable belt and a ceiling of fixed plates, between which, and in contact with which, may be situated the objects, the displacement of the belt causing the displacement of the objects at half the speed of the belt and causing the rolling thereof.

4,879,445
SEAM WELDING APPARATUS WITH EDGE DETECTION

Hitoshi Kawano; Mitsuhiro Hayashi; Yukio Yamamoto, and Kunikatsu Ban, all of Ise, Japan, assignors to N.P.W. Technical Laboratory Co., Mie and Shinko Electric Co., Ltd., Tokyo, both of, Japan

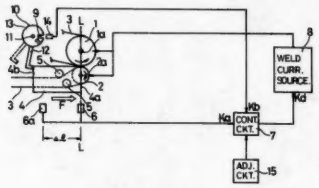
PCT No. PCT/JP87/00481, § 371 Date Apr. 14, 1988, § 102(e) Date Apr. 14, 1988, PCT Pub. No. WO88/00105, PCT Pub. Date Jan. 14, 1988

PCT Filed Jul. 7, 1987, Ser. No. 184,551

Claims priority, application Japan, Jul. 7, 1986, 61-103857[U]; Jul. 7, 1986, 61-158969

Int. Cl.[4] B23K *11/06*

U.S. Cl. 219—64 **3 Claims**



1. A seam welding apparatus using wire electrodes (3) running along outer peripheries of upper and lower roller electrodes (1, 2) disposed opposed to each other, in which apparatus a cylindrical body to be welded, which has an overlap section (S) formed by overlapping either edges of a metal plate or a surface-treated metal plate, is fed together with said wire electrodes between said roller electrodes, and said overlap section is heated and partially fused by a current flowing through and between said roller electrodes, thereby seam-welding said overlap section, comprising:

(a) a feeder (10) for feeding said overlap section between said roller electrodes by pushing a trailing edge of said cylindrical body, said feeder including a disk-like member (13) rotatable about a shaft (11), a slit (9) defined in said disk-like member, and a feed arm (12) having one end mounted on said shaft and another end adapted to engage said trailing edge of said cylindrical body; and

(b) an approach switch (14) for detecting the position of said slit as an indication that a leading edge of said cylindrical body is disposed at a nip between said roller electrodes.

4,879,446
INTERNAL WIRE GUIDE FOR GTAW WELDING

Gene E. Morgan, Camarillo, and Gerald E. Dyer, Canoga Park, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

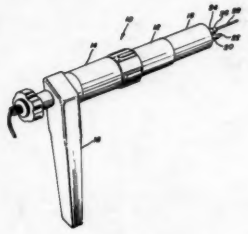
Filed Dec. 5, 1988, Ser. No. 279,625

Int. Cl.[4] B23K *9/16*

U.S. Cl. 219—75 **5 Claims**

1. In a welding torch for gas tungsten arc welding apparatus comprising a housing for supporting an axially extending annular nozzle having an exhaust opening at one end and an axially extending tungsten electrode, said electrode being disposed substantially coaxially within the nozzle, means for supplying electricity to said electrode and means for supplying an inert gas to said nozzle for shielding said electrode from oxidizing conditions,

the improvement comprising an axially elongated filler metal wire guide disposed internally within said housing and extending entirely through said nozzle spaced from the periphery of the nozzle, the axis of elongation of said guide within said nozzle always being substantially parallel to said electrode, and said guide and said electrode projecting through said nozzle beyond said one end.



4,879,447
PISTON ACTUATED WELDING GUN WITH PIVOTING ARM

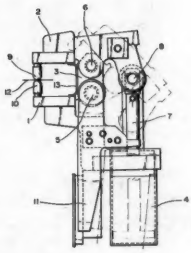
Shigeru Umeda, Kanagawa, Japan, assignor to Obara Corporation, Tokyo, Japan

Filed Aug. 19, 1988, Ser. No. 234,477

Claims priority, application Japan, Feb. 3, 1988, 63-21873

Int. Cl.[4] B23K *11/10*

U.S. Cl. 219—86.25 **10 Claims**



1. A welding gun comprising:

a fixed arm having an electrode at one end thereof and fixedly connected with a housing of a pressure cylinder at the other end thereof, and a first pin provided at a middle portion of the fixed arm, the fixed arm being swingably mounted on a base by the first pin and the pressure cylinder having a piston provided with a rod at the distal end thereof;

a movable arm having an electrode at one end thereof, said movable arm electrode generally opposing the electrode of the fixed arm, said movable arm having a second pin at the other end thereof for pivotally connecting the movable arm to the rod of the piston, and a middle portion of the movable arm having a third pin between the electrode and the second pin; and

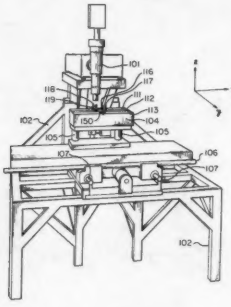
the first and third pins as respectively provided at the middle portions of the fixed arm and the movable arm being sidewardly spaced apart and joined together by a pivotal link for pivotally connecting the fixed arm and the movable arm.

4,879,448

APPARATUS FOR LASER WELDING AND ANNEALING

Edward C. Folger, Melbourne, and Glenn S. Witerski, Palm Bay, both of Fla., assignors to Storage Technology Corporation, Louisville, Colo.

Filed Oct. 24, 1988, Ser. No. 261,837
Int. Cl.[4] B23K *26/00*
U.S. Cl. 219—121.63 **22 Claims**



1. Apparatus for sequentially welding and annealing one or more sites on a workpiece using a beam of laser light transmitted along a fixed axis, which beam of laser light is focused at a predetermined focal point, comprising:

means for securing said workpiece in the path of said transmitted beam of laser light with a site on said workpiece located at said predetermined focal point of said transmitted beam of laser light to weld said site on said workpiece;

means for transporting said securing means along said fixed axis of said transmitted beam of laser light a predetermined distance to maintain said site on said workpiece in said path of said transmitted beam of laser light outside said focal point of said transmitted beam of laser light to anneal said site on said workpiece;

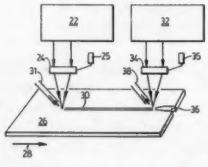
means for translating said securing means in directions normal to said axis of said transmitted beam of laser light for welding and annealing said site on said workpiece when said site on said workpiece is greater in size than said focal point of said transmitted beam of laser light.

4,879,449

MEANS OF ENHANCING LASER PROCESSING EFFICIENCY OF METALS

Walter W. Duley, P.O. Box 453, King City, Ontario, Canada (L0G 1K0), and Grant Kinsman, c/o York University, 4700 Keele St., Downsview, Ontario, Canada (M3J 1P3)

Division of Ser. No. 8,656, Jan. 30, 1987. This application May 12, 1988, Ser. No. 192,921
Int. Cl.[4] B23K *26/00*
U.S. Cl. 219—121.6 **9 Claims**



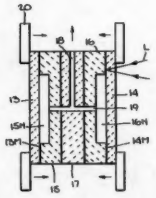
1. A work piece having a surface exhibiting a high reflectivity to laser radiation of a first wavelength and having formed thereon by a laser of a second wavelength a pattern of reduced reflectivity relative to the reflectivity of the first laser to enhance coupling between said surface and laser radiation of said first wavelength, said pattern exhibiting an increased surface roughness relative to said surface formed by evaporation and melting of said surface by said laser of said second wavelength.

4,879,450

LASER WELDING TECHNIQUE

Jean-Pascal Valentin, Povilley; Pierre Maitre, Besancon, both of France, and Masahiro Kazahaya, Southampton, Pa., assignors to Fischer & Porter Company, Warminster, Pa.

Filed Dec. 2, 1988, Ser. No. 279,175
Claims priority, application France, Dec. 2, 1987, 87 17102
Int. Cl.[4] B23K *26/00*
U.S. Cl. 219—121.64 **9 Claims**



1. A laser welding technique for welding together without using brazing material two parts having complementary faces, one of the parts being transparent to a laser beam and having a face composed of minute cavities, the face of the other part having light disruptive characteristics, said technique comprising the steps of:

(a) bringing the complementary faces of the parts together to create an interfacial region therebetween; and

(b) projecting a laser beam through the transparent part in a direction substantially normal to the face thereof which complements the face of the other part and focusing the beam onto the interfacial region, the focused beam being intercepted by the light disruptive face of the other part and being scattered thereby into the cavities in the face of the transparent part to produce multiple internal reflections therein generating sufficient heat which is entrapped in the region to cause the parts at their complementary faces to superficially melt and fuse.

4,879,451

LASER CUT VIDEO DISPLAY TERMINAL FILTER SCREEN

Mark Gart, Novato, Calif., assignor to Sun-Flex Company, Inc., Novato, Calif.

Filed Jul. 14, 1988, Ser. No. 219,537
Int. Cl.[4] B23K *26/18*
U.S. Cl. 219—121.69 **10 Claims**

1. A method of forming a radiation and reflection filter screen for a video display terminal comprising the steps of:

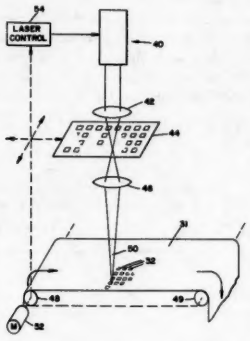
placing a sheet stock of plastic material on a substantially flat surface;

focusing a beam of coherent electrical energy toward said plastic sheet on said surface;

moving said beam in a predetermined pattern to move said beam across and longitudinally along said sheet stock;

pulsing said beam in accordance with said movement to

direct said focused beam in discrete areas across and along said sheet; and



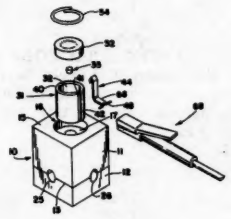
controlling said focusing, pulsing and movement of said beam to cause said beam to ablate said sheet stock in said predetermined pattern.

4,879,452

EXOTHERMIC WELDING APPARATUS AND METHOD

David P. Kovarik, Eastlake, and Michael D. Amos, Burton, both of Ohio, assignors to Erico International Corporation, Solon, Ohio

Filed Apr. 4, 1988, Ser. No. 177,075
Int. Cl.[4] B23K *23/00*
U.S. Cl. 219—130.4 **38 Claims**



1. A sealed package of exothermic welding material comprising a cup-shape ceramic container for such material, a heat consumable cap over the top of said container, a tap hole in the bottom of said container closed by a heat consumable disk, and a pair of insulated ignition wires extending from the exterior of the container to the interior of the container and having exposed spaced ends forming a spark gap embedded in the exothermic material.

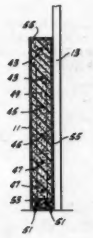
4,879,453

SELF-REGULATING BASEBOARD HEATER AND SYSTEM

Donald M. Cunningham, Pittsburgh, Pa., assignor to Emerson Electric Co., St. Louis, Mo.

Division of Ser. No. 829,943, Feb. 18, 1986, Pat. No. 4,689,470. This application Jun. 10, 1987, Ser. No. 60,739
Int. Cl.[4] H05B *3/14*
U.S. Cl. 219—213 **12 Claims**

1. A baseboard heating system for a room having a plurality of walls comprising a self-regulating heat producing strip disposed along each wall of a room, said strip extending substantially the entire length of a base of each wall, said strip including a plurality of pairs of spaced apart electrical conductors extending longitudinally along the base of at least one wall and spaced therefrom, self-limiting conductive material in physical contact with and forming a plurality of heat generating zones, said heat generating zones being formed between the conductors of each pair of the conductors and between conductors of adjacent pairs, and an electrically insulative jacket



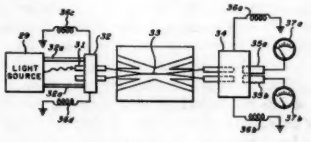
longitudinally covering all the pairs of conductors and the self-limiting conductive material, said strip further including two power conductors electrically insulated from each other and from the self-limiting conductive material, said power conductors extending longitudinally along the strip, and means for connecting the power conductors to a power source.

4,879,454

FIBER OPTIC FABRICATION FURNACE

David W. Gerdt, Charlottesville, Va., assignor to Sperry Marine Inc., Charlottesville, Va.

Filed Sep. 6, 1988, Ser. No. 240,986
Int. Cl.[4] H05B *1/02*; G02B *6/38*
U.S. Cl. 219—494 **17 Claims**



1. An apparatus for fabricating fiber optic devices comprising:

a body of thermal insulating material and predetermined geometrical cross-section having a fiber channel extending through said body from a first end thereof to a second end thereof, and a plurality of coil channels positioned about said fiber channel each having openings to said fiber channel at a mutually aligned location whereby heat may pass from said coil channel to said fiber channel, and an insertion slot extending from said first end to said second end of said body and from an outer surface of said body to said fiber channel, thereby providing a passage way for inserting optic fibers into said fiber channel;

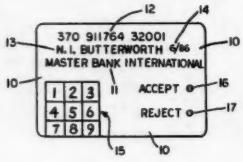
coil means positioned in said coil channels for providing heat in response to electrical current flowing therethrough; and

means coupled to said coil means for supplying said electrical current.

4,879,455
SELF-VERIFYING TRANSACTION CARDS

Nathan I. Butterworth, 6840 S. 284 W., and Lynda M. Butterworth, 6806 S. Baldwin, both of West Jordan, Utah 84084

Filed Jun. 17, 1985, Ser. No. 745,147
Int. Cl.[4] G06K *5/00*; G06F *15/30*
U.S. Cl. 235—280 5 Claims



1. A transaction or authorization card, such as a credit card, check guarantee card or identification card, said card comprising:

data input means which is built into the card as a self-contained integral component card, said data input means being adapted to generate data by manual manipulation thereof by a holder of the card;

memory means which is also built into the card as a self-contained integral component of the card, said memory means being adapted to be programmed with and store security coded data;

programming means included in said card as a self-contained integral component of the card for the holder of the card to (1) initially enter said coded data into said memory means and (2) to enter replacement coded data for existing coded data at any time, wherein following the initial entry of said coded data, said programming means is activated only by entry of the existing coded data and a coded request for entering replacement coded data;

analyzer means which is also built into the card as a self-contained integral component of the card, said analyzer means being adapted to receive data generated by said data input means and for comparing the data from said input means with the coded data held in said memory means; and

indicator means which is also built into the card as self-contained integral component of said card and which is associated with said analyzer means, said indicator means being adapted to give a visual indication of acceptable use of said card when the analyzer means determines that the data which has been manually entered through said data input means by the holder of said card is the same as the coded data held in said memory of said card, said indicator means further adapted to give a visual indication to reject use of the card when the analyzer means determines that the data which has been manually entered through said data input means by the holder of said card is not the same as the coded data held in said memory means of said card.

4,879,456
METHOD OF DECODING A BINARY SCAN SIGNAL

Craig D. Cherry; Andrew P. Taussig, both of Eugene, and Michael T. Brooks, Veneta, all of Oreg., assignors to Spectra-Physics, Inc., San Jose, Calif.

Filed Jun. 18, 1987, Ser. No. 64,110
Int. Cl.[4] G06K *7/10*
U.S. Cl. 235—462 20 Claims

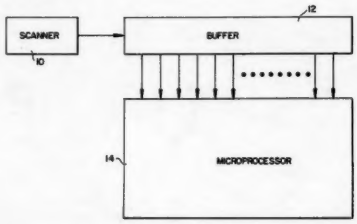
1. A method of decoding a binary scan signal consisting of a bit sequence produced by an electro-optical scanning device as the device scans bar code symbols on a label, the bits in said sequence corresponding to light and dark spaces making up said bar code symbols, comprising the steps of:

a. supplying said binary scan signal to a storage buffer such that said buffer contains a plurality of bits most recently produced by said scanning device,

b. selecting a portion of said bit sequence which defines a large light space,

c. subjecting the bits in the sequence following those defining said large light space to a series of tests to determine whether such bits were produced by scanning a bar code symbol which is valid in one or more of several bar codes,

d. decoding tyhe bar code symbol in the codes in which it is valid,



e. subjecting the next bits to the sequence to a series of tests to determine whether such bits were produced by scanning a bar code symbol which is valid in any of the bar codes in which the previously decoded bar code symbol is valid,

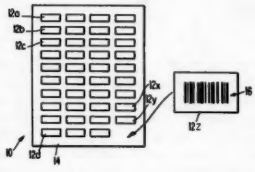
f. decoding the bar code symbol in the codes in which it and the previously decoded bar code symbol are valid, and

g. repeating steps e. and f. above until all bar code symbols on the label have been decoded.

4,879,457
METHOD FOR ETCHING A BAR CODE ON METAL

Richard Ludden, 6030 Adams St., Lincoln, Nebr. 68507

Continuation-in-part of Ser. No. 114,066, Oct. 29, 1987, Pat. No. 4,791,284. This application Dec. 12, 1988, Ser. No. 282,586
Int. Cl.[4] G06K *19/02*
U.S. Cl. 235—487 13 Claims



1. A method for etching a bar code having a plurality of dark bars on a metal surface, comprising the steps of:

(a) preparing a carrier web having a plurality of elongated openings, each opening corresponding in size and position to a respective dark bar of the bar code;

(b) adhesively attaching the carrier web to the metal surface, the adhesive attachment bonding the web to the metal surface so that fluid cannot seep between the web and the metal surface;

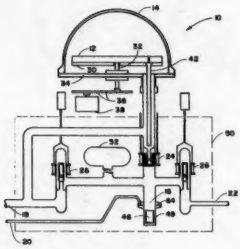
(c) electrochemically etching the metal surface through the openings in the web, step (c) including electrochemically etching the metal surface using an AC current to produce a dark metal compound where the metal is exposed through the openings; and

(d) removing the web from the metal surface.

4,879,458
AUTOMATIC SAMPLE SYSTEM FOR MASS SPECTROMETER

Robert J. Brunfeldt, and James C. Jackson, both of Bartlesville, Okla., assignors to R. J. Brunfeldt Company, Inc., Bartlesville, Okla.

Continuation of Ser. No. 765,835, Aug. 15, 1985. This application Sep. 4, 1987, Ser. No. 94,018
Int. Cl.[4] H01J 49/04
U.S. Cl. 250—288 **1 Claim**



1. An automated sample inlet system to a mass spectrometer (MS) comprising:

(a) holder means for retaining a plurality of sample ampules and sequentially releasing individual sample ampules to drop by gravity, each of said individual sample ampules comprising a low melting enclosure containing a volatile sample;

(b) a sealed enclosure surrounding said holder means with means to maintain said sealed enclosure under substantially constant vacuum at ambient temperature;

(c) a vaporizing chamber within a heated oven, means within said vaporizing chamber for sequentially receiving said individual sample ampule, for melting said low melting enclosure, and thus releasing said volatile sample within said vaporizing chamber and producing a vaporized sample, said vaporizing chamber having a first valve means to sequentially release said vaporized sample to said MS and a second valve means to sequentially evacuate said vaporizing chamber;

(d) a conduit means having one end in vacuum communication with said sealed enclosure with the other end of said conduit means within said heated oven in sealed communication with said vaporizing chamber, said conduit means positioned to convey said released individual sample ampoule from said sealed enclosure to said vaporizing chamber;

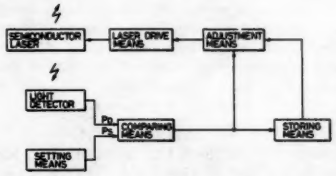
(e) an inverted ball and seat valve means located in that portion of said conduit within said heated oven to: (i) control the entry of said sample ampule from said sealed enclosure to said vaporizing chamber after said evacuation of said vaporizing chamber, and thereafter isolate said sample ampule within said vaporizing chamber.

4,879,459
AUTOMATIC POWER CONTROLLER FOR SEMICONDUCTOR LASER

Kiyoshi Negishi, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 16, 1988, Ser. No. 157,184
Claims priority, application Japan, Feb. 16, 1987, 62-32868
Int. Cl.[4] G01J 1/32
U.S. Cl. 250—205 **10 Claims**

1. An automatic power controller for a semiconductor laser, comprising: a light detector for detecting the intensity of light emitted from said laser; means for setting a reference value P_S; means for comparing the detected value P_D of said intensity with the set reference value P_S and for outputting a binary value representing a result of said comparison; adjustment means for providing an adjustment value depending on the result of said comparison; laser drive means for causing an electrical current corresponding to said adjustment value to flow through said laser; and storage means for sequentially

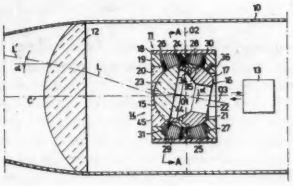


storing the result of said comparison; said adjustment means operable for increasing said adjustment value when $P_D < P_S$ and for decreasing said adjustment value when $P_D > P_S$, wherein said adjustment value is set when said sequentially stored result is sequentially shifted in said storage means a prescribed number of times of two or more.

4,879,460
GYROSLABILIZED OPTICAL RADIATION DEFLECTION DEVICE PROVIDING A STABILIZED RADIATION SENSITIVITY LOBE

Lars J. Schleimann-Jensen, Danderyd; Alf E. Engding, Akersberga, and Anders F. Aström, Farsta, all of Sweden, assignors to U.S. Philips Corporation, New York, N.Y.

PCT No. PCT/SE87/00253, § 371 Date Mar. 30, 1988, § 102(e) Date Mar. 30, 1988, PCT Pub. No. WO87/07706, PCT Pub. Date Dec. 17, 1987
PCT Filed May 20, 1987, Ser. No. 150,369
Claims priority, application Sweden, Jun. 30, 1986, 8602506
Int. Cl.[4] G01J 1/20
U.S. Cl. 250—230 R **5 Claims**



1. A gyro stabilized optical radiation deflection device for mounting in an envelope which includes a transmitter and/or receiver of radiation outgoing from or incoming to such envelope, said device being in the radiation path from/to such transmitter or receiver and providing a directed sensitivity lobe for said radiation, said envelope being subject to motions relative to fixed spatial reference directions; said deflection device comprising: a rotatable deflection body having a spherical outer contour and which is seated in a spherical recess in a support which is fixedly connected to said envelope, so that said body is movable in three rotational degrees of freedom in said recess; and means for imparting rapid rotation to said body about a spin axis which substantially coincides with the direction of said radiation sensitivity lobe, so that said body serves as a gyro rotor; characterized in that:

a central portion of said rotor and a central portion of said recess are prisms transparent to said radiation, and to-

gether form an adjustable diffraction prism for deflecting said radiation sensitivity lobe;

said prism portions of said recess and said gyro motor each have a wall serving as an input/output surface for said radiation; and

said prism portions of said recess and said gyro rotor are of materials having refractive indices such that an angular change in the direction of said envelope relative to the spin axis of said gyro rotor causes said diffraction prism to produce a corresponding angular change in direction of outgoing and/or incoming radiation thereto, whereby a corresponding angular change in direction of said radiation sensitivity lobe is produced relative to said envelope.

4,879,461

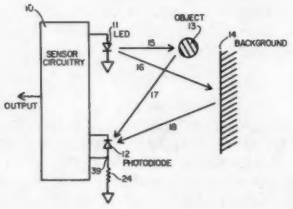
ENERGY FIELD SENSOR USING SUMMING MEANS

Harald Philipp, 15320 NE. 11th, K326, Bellevue, Wash. 98007

Filed Apr. 25, 1988, Ser. No. 185,843

Int. Cl.[4] G01N *9/04*

U.S. Cl. 250—221 **20 Claims**



1. An apparatus for sensing a disturbance within a sensing region, comprising:

an emitting means for emitting a field of energy, said field of energy being disturbed by a change in said sensing region;

sensing means for receiving energy from the emitted field of energy to produce a corresponding sensing signal;

signal generation means for producing an electrical signal complementary in nature to the sensing signal that includes a digital to analog converter means for digital control of the amplitude of the electrical signal complementary to the sensing signal;

summing means for adding the sensing signal and the electrical signal complementary to the sensing signal to create a summation signal whose amplitude is less than the sensing signal or opposite in polarity to the sensing signal; and

detection means responsive to the summation signal to create a detection signal indicative of an energy field disturbance, such means including a conversion means to translate the detection signal to a digital signal proportionate to the level of the detection signal.

4,879,462

OPTO-ELECTRONIC SCALE-READING APPARATUS HAVING SPATIAL FILTER FOR WAVELENGTH SEPARATION

William F. N. Stephens, Glos, United Kingdom, assignor to Renishaw plc, Wotton-under-Edge, United Kingdom

PCT No. PCT/GB87/00435, § 371 Date Feb. 18, 1988, § 102(e) Date Feb. 18, 1988, PCT Pub. No. WO87/07945, PCT Pub. Date Dec. 30, 1987

PCT Filed Jun. 22, 1987, Ser. No. 159,364

Claims priority, application United Kingdom, Jun. 21, 1986, 8615197

Int. Cl.[4] H01J *5/16, 40/14*

U.S. Cl. 250—237 G **11 Claims**

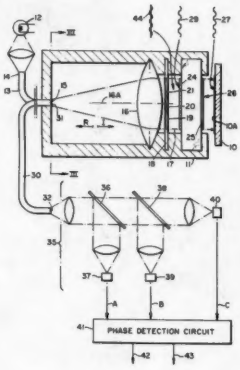
1. A opto-electronic scale reading apparatus comprising

a scale defined by spaced lines, the spacing of said lines defining a nominal periodicity; and

a read head moveable relative to said scale in the direction of the spacing of said lines, said read head including:

a projecting means for projecting a beam of incident light;

a fringe generator disposed in the path of said incident beam, said fringe generator generating on said scale a fringe pattern having said nominal periodicity, said scale transmitting light defining said fringe pattern; and



spatial filter means disposed in the path of the light transmitted by said scale, said filter means preventing the passage therethrough of a fringe pattern whose spatial periodicity departs from said nominal periodicity by more than a given value.

4,879,463

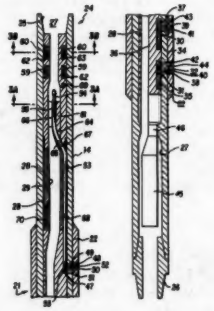
METHOD AND APPARATUS FOR SUBSURFACE FORMATION EVALUATION

Peter D. Wraight, Missouri City; Edouard Marienbach, Houston; Jean-Michel Hache, Sugar Land; Erik Rhein-Knudsen, and Mike Evans, both of Missouri City, all of Tex., assignors to Schlumberger Technology Corporation, Houston, Tex.

Filed Dec. 14, 1987, Ser. No. 132,494

Int. Cl.[4] G01V *5/00*

U.S. Cl. 250—270 **46 Claims**



3. An apparatus for investigating properties of earth formations surrounding a borehole comprising:

a. a tubular body adapted to be coupled to a drill string and adapted to permit the downward flow of drilling fluid therethrough;

b. a neutron source positioned within said tubular body on its cylindrical axis and adapted to permit the downward flow

of drilling fluid therearound for bombarding the formation with high energy neutrons and for producing secondary radiation as a result of neutron-formation interaction;

c. first secondary radiation detector means positioned within said tubular body at a first spaced location from said neutron source for detecting secondary radiation and for generating a first signal indicative thereof;

d. second secondary radiation detector means positioned within said tubular body at a second spaced location from said neutron source for detecting secondary radiation and for generating a second signal indicative thereof;

e. a gamma ray source positioned against the interior side of said tubular body at an axial position different from the position of said neutron source and permitting the downward flow of drilling fluid on one side thereof through the interior of said tubular body;

f. first gamma ray detecting means positioned at a first spaced location from said gamma ray source against the interior side of said tubular body for detecting gamma rays and for generating a third signal indicative thereof, said first gamma ray detecting means comprising a first gamma ray scintillator coupled to a photomultiplier;

g. second gamma ray detecting means positioned at a second spaced location from said gamma ray source against the interior side of said tubular body for detecting gamma rays and for generating a fourth signal indicative thereof, said second gamma ray detecting means comprising a second gamma ray scintillator coupled to a photomultiplier, said first and second gamma ray detecting means being adapted to permit the downward flow of drilling fluid on one side thereof through the interior of said tubular body; and

h. means for combining said first and second signals and said third and fourth signals to respectively generate signals indicative of formation porosity and a formation characteristic selected from the group comprising formation density and formation photoelectric absorption coefficient.

4,879,464

RADIATION IMAGING APPARATUS

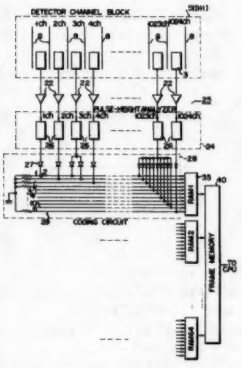
Kazuhiro Iinuma, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 641,574, Aug. 16, 1984, abandoned. This application Feb. 5, 1987, Ser. No. 14,201

Claims priority, application Japan, Aug. 19, 1983, 58-150987; Nov. 24, 1983, 220983

Int. Cl.[4] G01T *1/208*

U.S. Cl. 250—361 R **24 Claims**



1. A radiation imaging apparatus comprising:

means for detecting radiation emitted from an object under investigation to which a radioactive substance has been administered, said detecting means including;

a plurality of detector elements equally divided into a first number of detector subblocks, and

means for generating electric pulse signals each representing the radiation detected by said detector elements in said detector subblocks;

a plurality of pulse-height analyzer sections each coupled to a different one of said detector elements in said detector subblocks to analyze said electric pulse signals, said analyzer sections each including means for selecting only those of said electric pulse signals having at least a predetermined signal level;

means for coding said electric pulse signals selected by said pulse-height analyzer sections and for separately producing coded signals representing unique detection positions in each of said detector subblocks;

first memory means for temporarily storing said coded signals from said coding means within a predetermined time period into first memory positions, said first memory positions being organized as a matrix array with each corresponding to a different detector subblock;

second memory means for storing said coded signals from said first memory means in second memory positions organized in accordance with said matrix array, said coded signals in said second memory means representing an image data signal of said object; and

means for displaying said image data signal as a radiation distribution map.

4,879,465

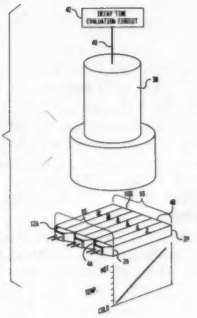
DETECTOR MODULE FOR SCINTILLATION CAMERAS

Dennis E. Persyk, Barrington, and Hamill James J., Rolling Meadows, both of Ill., assignors to Siemens Gammasonics, Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 913,798, Sep. 30, 1986, Pat. No. 4,810,885. This application Mar. 29, 1988, Ser. No. 174,574

Int. Cl.[4] G01T *1/164*

U.S. Cl. 250—363.02 **5 Claims**



1. A detector module for scintillation cameras, comprising:

a plurality of elongated scintillator strips which have like physical dimensions and are elongated between first and second ends, one half of said plurality being of NaI(Tl) and the other half of said plurality being of CsI(Na), the scintillator strips being so arranged that they together define a region whih extends between first and second sides with all of the first ends of the scintillator strips lying on the first side and all of the second ends of the scintillator strips lying on the second side, the scintillator strips being arranged in a succession of NaI(Tl)-CsI(Na) pairs in a manner that adjacent scintillator strips are always of different scintillator materials;

a plurality of photodiodes, each being uniquely associated

with a particular pair of adjacent scintillator strips and being optically linked to the first ends thereof;

means for establishing a thermal gradient between the first and second sides;

a photomultiplier tube optically linked to the scintillator strips to register scintillation events occurring therein; and

means for determining the decay time of scintillation events detected by the photomultiplier tube.

4,879,466

SEMICONDUCTOR RADIATION DETECTOR

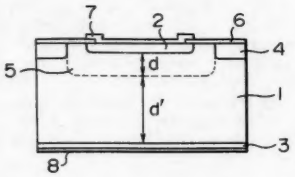
Hiroshi Kitaguchi, Ibaraki; Shigeru Izumi, Tokyo, and Satoshi Suzuki, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 29, 1988, Ser. No. 150,205

Claims priority, application Japan, Feb. 6, 1987, 62-24563

Int. Cl.[4] G01T *1/24*; H01L *27/14*

U.S. Cl. 250—370.14 **13 Claims**



1. A semiconductor radiation detector, comprising:

a p-n junction;

a substrate layer provided adjacent to a depletion layer formed at said p-n junction and having a radiation absorbing layer of a silicon equivalent thickness not smaller than 140 μm; and

a channel stopper provided in the surface of said substrate layer and surrounding said p-n junction, to prevent said depletion layer from spreading along the surface of said substrate layer.

4,879,467

APPARATUS FOR THE TRANSLATORY MANIPULATION OF AN ELEMENT SUCH AS AN AXLE

Jean F. Muller, Metz; Francois G. Tollitte, Verdun; Gabriel Krier, Metz; Serge Dominiak, Ars sur Moselle; Andre Eberhardt, Metz, and Marcel Berveiller, Woippy, all of France, assignors to Universite de Metz, Metz, France

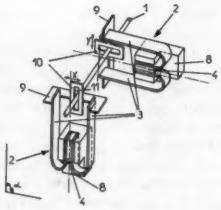
PCT No. PCT/FR87/00509, § 371 Date Aug. 23, 1988, § 102(e) Date Aug. 23, 1988, PCT Pub. No. WO88/04599, PCT Pub. Date Jun. 30, 1988

PCT Filed Dec. 22, 1987, Ser. No. 249,573

Claims priority, application France, Dec. 23, 1986, 86 18244

Int. Cl.[4] B01D *59/44*; G01K *5/10*; G01N *21/00*

U.S. Cl. 250—288 **17 Claims**



1. Apparatus for translatory manipulation, of an element (1), such as an axle, characterized in that it comprises a displacement device (2) for each direction in space in which the axle (1) is to be manipulated, each displacement device (2) comprising two blades (3) prestressed in opposition, constituted by an alloy that is pseudoelastic or has shape memory, disposed on opposite sides of heating and/or cooling means (4) giving rise to a thermal gradient between the two blades (3) and thus their martensitic transformation causing their deformation.

4,879,468

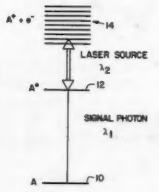
PHOTOIONIZATION OPTICAL FILTER AND DETECTOR

John C. Brock, Redondo Beach, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Oct. 28, 1985, Ser. No. 791,663

Int. Cl.[4] G01J *5/36*

U.S. Cl. 250—374 **15 Claims**



9. A method of detecting signal photons at a selected narrow bandwidth and low signal level, comprising the steps of:

selecting an atomic or molecular system to provide absorption of signal photons of the desired wavelength;

absorbing signal photons in a vapor cloud of the selected atomic or molecular system and thereby transforming atoms or molecules of the vapor to a selected excited metastable state, in numerical proportion to the number of signal photons of the particular wavelength admitted into the chamber;

optically pumping a large proportion of the metastable-state atoms or molecules to an ionized state in which electrons are freed; and

collecting the free electrons means of an electric field.

4,879,469

MIXED MEDIA FOR KINESTATIC CHARGE DETECTORS

Frank A. DiBianca, Chapel Hill, N.C., assignor to University of North Carolina, Chapel Hill, N.C.

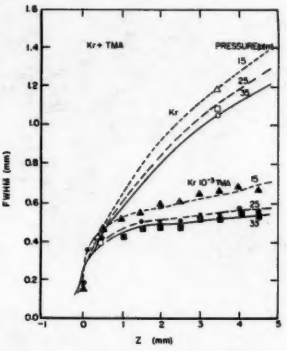
Filed May 13, 1988, Ser. No. 193,527

Int. Cl.[4] G01T *1/185*

U.S. Cl. 250—374 **17 Claims**

1. A detection medium for use in a kinestatic charge detec-

tor, said medium comprising a mixture of xenon gas and one or more gases containing molecules composed on one or more



atomic constituents, wherein at at least one of said gases has a higher atomic number than said xenon gas.

4,879,470

PHOTOELECTRIC CONVERTING APPARATUS HAVING CARRIER ELIMINATING MEANS

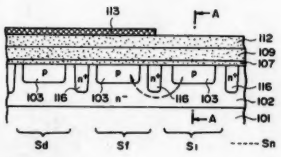
Shigetoshi Sugawa; Yoshio Nakamura, both of Atsugi; Nobuyoshi Tanaka, Tokyo, and Isamu Ueno, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 13, 1988, Ser. No. 143,186

Claims priority, application Japan, Jan. 16, 1987, 62-006252; Jan. 16, 1987, 62-006255; Mar. 31, 1987, 62-077951

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—578 **24 Claims**



1. A photoelectric converting apparatus comprising:

a plurality of photosensors divided into an opening portion and a light shielding portion; and

means for biasing at least one photosensor provided between the photosensors in said light shielding portion and the photosensors in the opening portion to prevent a flow of photosignals from said opening portion to said light shielding portion.

4,879,471

RAPID-SCANNING INFRARED SENSOR

John A. Dahlquist, Palo Alto, Calif., assignor to Measurex Corporation, Cupertino, Calif.

Filed Mar. 25, 1987, Ser. No. 29,805

Int. Cl.[4] G01J *1/00*; G01N *21/81*

U.S. Cl. 250—359.1 **23 Claims**

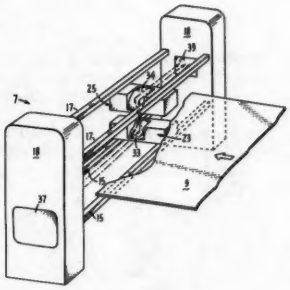
1. A system for measuring optically-sensitive properties relating to the composition of travelling webs of sheet material during manufacture, comprising:

(a) first track means mounted to extend generally parallel to one face of a travelling web in the cross direction;

(b) a stationary light source means arranged to direct collimated light, having ranges of wavelengths, parallel to the first track means;

(c) first parabolic reflector means mounted to travel along the first track means and to focus the collimated light as rays directed directly from the first parabolic reflector means. onto the adjacent face of the web;

(d) second track means mounted to extend generally parallel to the first track means adjacent the opposite face of the web;



(e) second parabolic reflector means mounted to travel along the second track means to immediately collect rays that are transmitted through the web from the first parabolic reflector means; and

(f) stationarily-mounted light detector means to detect rays collected by the second parabolic reflector means at least at two selected ranges of wavelengths to provide measurement of optical absorption properties relating to the composition of the travelling web at selected locations.

4,879,472

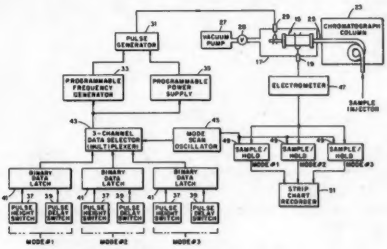
MULTIPLEXED ELECTRONICALLY PROGRAMMABLE MULTIMODE IONIZATION DETECTOR FOR CHROMATOGRAPHY

Marcus B. Wise, Kingston, and Michelle V. Buchanan, Knoxville, both of Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 19, 1988, Ser. No. 196,693

Int. Cl.[4] G01N *27/70*

U.S. Cl. 250—379 **14 Claims**



1. A device for detecting and differentiating organic compounds by electron affinity, comprising:

an electron capture cell including a pair of electrodes communicating with said cell and an ionization radiation source disposed therein;

means for injecting gaseous compounds into said cell;

means for detection and measurement of electric current

variation in said cell as a function of the composition of said gaseous compounds in said cell;

means for providing a constant subatmospheric pressure within said cell; and

means for applying programmed sequences of bias voltage pulses to said pair of electrodes of said cell at selected different intervals to alter the detection mode response of said cell.

4,879,473

ELECTRON-BEAM EXPOSURE APPARATUS

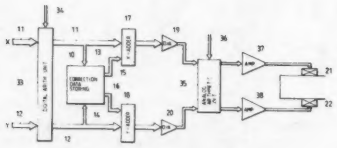
Nobuyuki Zumoto; Masahiko Sakamoto, and Susumu Hoshinouchi, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 23, 1988, Ser. No. 248,071

Claims priority, application Japan, Sep. 25, 1987, 62-238636

Int. Cl.[4] H01J *37/00*

U.S. Cl. 250—492.2 **3 Claims**



1. An electron-beam exposure apparatus for exposing a substrate by an electron-beam in which beam position data in an X-axis direction and in a Y-axis direction which are supplied from a pattern data storing means or a pattern data generating means, are applied to an electron-beam deflection means **(21, 22)** after digital-to-analog conversion, comprising: means **(33)** for removing correction data which can be expressed as a cubic function, correction data storing means **(10)** for storing correction data other than data which can be expressed by a cubic function, adding means **(17, 18)** for adding the correction data from the correction data storing means to beam position data in both the X- and Y-axis directions; digital-to-analog converting means **(19, 20)** for subjecting output signals from the adding means to digital-to-analog conversion; and an analog arithmetic operation means **(35)** for subjecting outputs from the digital-to-analog converting means to analog correction based on either a deflection correction control signal **(36)** or a predetermined cubic-function, wherein the electron-beam deflection is corrected.

4,879,474

CONTACT-FREE OPERATING ELECTRONIC SWITCHGEAR

Jean-Luc LaMarche, Langenargen, Fed. Rep. of Germany, assignor to i f m Electronic GmbH, Fed. Rep. of Germany

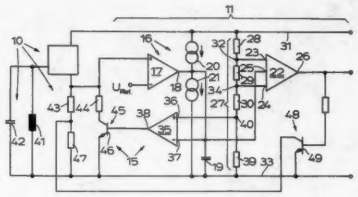
Filed Jul. 7, 1988, Ser. No. 216,173

Claims priority, application Fed. Rep. of Germany, Jul. 7, 1987, 3722334

Int. Cl.[4] H01H *35/00;* **G01N** *27/00*

U.S. Cl. 307—116 **16 Claims**

1. A contact-free operating electronic switchgear, comprising an oscillator capable of being externally affected, a switching amplifier having at least two operating units disposed downstream of the oscillator, an electronic switch which can be controlled by the oscillator via the switching amplifier, a supply circuit for the provision of a supply voltage for the oscillator and for the switching amplifier, and a control circuit between the two operating units of the switching amplifier and the oscillator, wherein the control circuit controls the oscilla-



tor such that the oscillator also oscillates when it is externally affected.

4,879,475

DEVICE AND METHOD FOR MAINTAINING A VOLTAGE LEVEL IN A CONTROL CIRCUIT

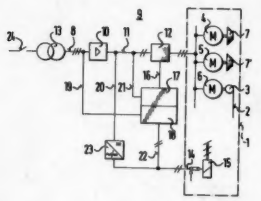
Joachim Rüge, Monchengladbach; Gregor Kathke, and Helmut Schlösser, both of Viersen, all of Fed. Rep. of Germany, assignors to W. Schlafhorst & Co., Fed. Rep. of Germany

Continuation of Ser. No. 103,898, Oct. 2, 1987, abandoned. This application Dec. 28, 1988, Ser. No. 290,854

Claims priority, application Fed. Rep. of Germany, Oct. 3, 1986, 3633627

Int. Cl.[4] H02J *9/00*

U.S. Cl. 307—68 **3 Claims**



1. A device for temporarily maintaining a voltage level in a control circuit for auxiliary devices of a textile machine, the textile machine having a motor means which receives current supplied by a line voltage, comprising:

an intermediate direct current circuit connected to the control circuit via a coupling device; a converter;

a converter control means; a line voltage sensing means connected to the line voltage;

wherein said intermediate direct current circuit and said converter are connected in series between the line voltage and the motor means;

said converter is controllable by said converter control means to supply current from the line voltage to the motor means and to reversibly supply current generated by the residual inertial energy of the motor to the control circuit; and

said converter control means being connected to the line voltage sensing means and being responsive to the line voltage sensing means to control the converter in accordance with the requirement that the converter is reversed to supply current generated by the motor means to the control circuit when the line voltage sensing means senses a drop voltage level in the line voltage.

4,879,476

METHOD AND APPARATUS FOR TRANSMITTING SIGNALS

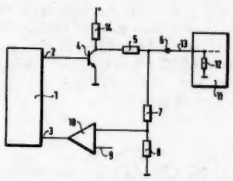
Hartmut Schweizer, Korntal, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jul. 5, 1984, Ser. No. 627,744

Claims priority, application Fed. Rep. of Germany, Sep. 6, 1983, 3332037

Int. Cl.[4] H02J *1/00*

U.S. Cl. 307—10.1 4 Claims



1. In a method of transmitting signals in a serial form from a control device to a diagnostic device of a motor vehicle by means of a diagnostic data-conducting lead interconnected between the diagnostic device and the control device, the improvement comprising the steps providing current source means immediately in the control device so that signals are transmitted from the control device to the diagnostic device through said data-conducting lead as a current, and measuring voltage at said diagnostic data lead to detect whether the diagnostic device is connected to the control device whereby diagnostic data are automatically transmitted from the control device to the diagnostic device when the connection of the diagnostic device with the control device is detected.

4,879,477

PROCEDURE AND CIRCUIT ARRANGEMENT FOR SWITCHING ON AN INDUCTANCE SUBJECT TO REMANENCE

Michael Krüger, Edingen-Neckarhausen, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Apr. 17, 1987, Ser. No. 40,573

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1986, 3614057

Int. Cl.[4] H03K *17/22*

U.S. Cl. 307—239 9 Claims

1. Method of switching an inductance having remanence, on to and off from an AC voltage source by means of a controlled switch, comprising the steps of: forming a signal representing predetermined phase angles of said AC-voltage source corresponding to the magnetic state of the inductance before switching it on, and switching said controlled switch on by means of said signal.

4,879,478

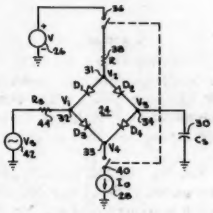
FAST SAMPLE AND HOLD CIRCUIT

Eugen Gershon, Los Gatos, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Continuation of Ser. No. 771,434, Aug. 30, 1985, abandoned. This application Aug. 21, 1987, Ser. No. 88,989

Int. Cl.[4] G11C *27/02*

U.S. Cl. 307—353 30 Claims



1. A sample and hold circuit comprising:

an input terminal for receiving an input signal to be sampled;

a charge storage means to create an output signal at an output terminal in proportion to the amount of charge stored therein;

current source means for supplying a constant current;

voltage source means for supplying a constant voltage at an output terminal;

a bridge means coupled between said input terminal and said charge storage means and coupled to said current source means and to said voltage source means for selectively charging said charge storage means either with a variable current from said voltage source means or discharging said charge storage means with a fixed current drawn by said current source means depending upon the relative magnitudes of said input signal and said output signal to thereby change said output signal until it substantially matches said input signal;

a resistor coupled between said output terminal of said voltage source means and said bridge means for limiting the maximum current which can be drawn from said voltage source means.

4,879,479

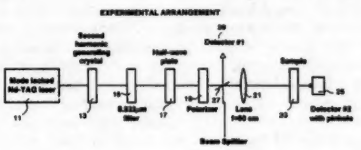
POLY-YNE NONLINEAR OPTICAL MATERIALS

Claude C. Frazier, Ellicott City; Shekhar Guha, Columbia, and Wenpeng Chen, Bethesda, all of Md., assignors to Martin Marietta Corporation, Bethesda, Md.

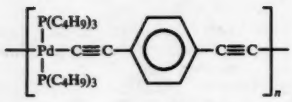
Filed Aug. 5, 1987, Ser. No. 81,785

Int. Cl.[4] G02F *1/35*

U.S. Cl. 307—425 43 Claims



15. A device for optical switching, frequency conversion, and protection of sensory organs and optical and electronic sensors which comprises a dry, free-standing cast film of a power-limiting, polymerized transition metal poly-yne having repeating units of the formula:



interposed in the path of a laser light so as to have a nonlinear optical effect thereupon.

4,879,480

BICMOS GATE ARRAY

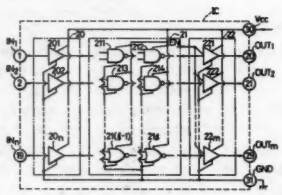
Yukio Suzuki, Hinode; Ikuro Masuda; Masahiro Iwamura, both of Hitachi; Shinji Kadono, Fussa; Akiro Uragami, Takasaki; Masayoshi Yoshimura, Maebashi, and Toshiaki Matsubara, Takasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 102,245, Sep. 28, 1987, abandoned, which is a continuation of Ser. No. 8,467, Jan. 29, 1987, abandoned, which is a continuation of Ser. No. 575,567, Jan. 31, 1984, Pat. No. 4,689,503. This application Sep. 2, 1988, Ser. No. 240,450

Claims priority, application Japan, Jan. 31, 1983, 58-12711; Jan. 31, 1983, 58-12712; Jan. 31, 1983, 58-12713

Int. Cl.[4] H03K *19/01*

U.S. Cl. 307—446 **19 Claims**



1. A semiconductor integrated circuit comprising:

(1) an input circuit having input and output terminals, said input circuit performing a switching operation responding to an input signal received at said input terminal and including means for providing an output signal at said output terminal; and

(2) an internal logic block including a plurality of gate circuits, said internal logic block performing logic operations on input signals received at input terminals of said plurality of gate circuits and generating output signals based upon the logic operations at output terminals of said plurality of gate circuits, wherein said output terminal of said input circuit is commonly connected with input terminals of said plurality of gate circuits in accordance with a predetermined gate array type arrangement, and said means for providing the output signal in said input circuit includes a first bipolar output transistor, a base of which responds to said input signal received at said input terminal, a current flowing through a collector-emitter path of said first bipolar output transistor charging or discharging a capacitance at said output terminal of said input circuit and a second bipolar output transistor, a base of which is supplied with a base drive signal responding to said input signal, a current flowing through a collector-emitter path of said second bipolar output transistor charging or discharging said capacitance, wherein said collector-emitter path of said second bipolar output transistor is connected in series with said collector-emitter path of said first bipolar output transistor between a first and a second operating potential, wherein said charging or discharging operation executed by said second bipolar transistor is opposite to the charging or discharging operation executed by said first bipolar transistor, wherein said input circuit further includes a CMOS buffer circuit, an input of which responds to said input signal and an output of which generates said base drive signal for said second bipolar output transistor,

wherein the logic operations of said internal logic block is determined in accordance with the predetermined gate array type arrangement, and

wherein said plurality of gate circuits of said internal logic block are formed in accordance with the predetermined gate array type arrangement to include a plurality of quasi-CMOS circuits and a plurality of CMOS circuits, input stages of said quasi-CMOS circuits being composed of P-channel and N-channel MOSFETs and output stages of said quasi-CMOS circuits being composed of bipolar transistors, each of said CMOS circuits including P-channel and N-channel MOSFETs.

4,879,481

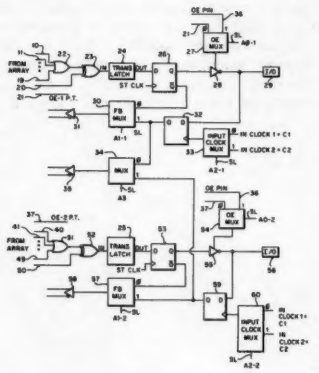
DUAL I/O MACROCELL FOR HIGH SPEED SYNCHRONOUS STATE MACHINE

Jagdish Pathak, Los Altos Hills; Stephen M. Douglass, Santa Clara, and Dov-Ami Vider, Sunnyvale, all of Calif., assignors to Cypress Semiconductor Corporation, San Jose, Calif.

Filed Sep. 2, 1988, Ser. No. 241,015

Int. Cl.[4] H03K *19/177*

U.S. Cl. 307—465 **6 Claims**



1. An input/output macrocell for a programmable logic device, said macrocell being coupled to a state clock to receive a state clock signal to operate a programmable array as a synchronous state machine and being coupled to a first and a second output of said array, said input/output macrocell comprising:

a first and a second input/output connector means;

a first and a second state register, said first state register having an input, an output and a complementary output and having a clock input, said clock input being coupled to receive a state clock signal, said second state register having an input, an output and a complementary output and having a clock input being also coupled to receive said state clock signal, said input of said first state register being coupled to said first output of said array through a first transparent latch, said input of said second state register being coupled to said second output of said array through a second transparent latch;

a first and a second tri-state latched output driver, said first tri-state latched output driver having an input, an output and a control input for receiving a first output enable signal, said output of said first tri-state latched output driver being coupled to said first input/output connector

means, said input of said first tri-state latched output driver being coupled to said output of said first state register to provide the signal present on said output of said first state register to said first connector means when said first output enable signal is active, said second tri-state latched output driver having an input, an output and a control input for receiving a second output enable signal, said output of said second tri-state latched output driver being coupled to said second input/output connector means, said input of said second tri-state latched output driver being coupled to said output of said second state register to provide the signal present on said output of said second state register to said second connector means when said second output enable signal is active;

a first and a second feedback multiplexer, said first feedback multiplexer having an output coupled to a first input to said programmable array and having a first and a second input which are selected between by a first select line means, said second feedback multiplexer having an output coupled to a second input to said programmable array and having a first and a second input which are selected between by a second select line means, said first input of said first feedback multiplexer being coupled to said complementary output of said first state register and said first input of said second feedback multiplexer being coupled to said complementary output of said second state register;

a first and a second input register, said first input register having an input and an output and a clock input, said clock input being coupled to receive a first input clock signal, said input of said first input register being coupled to said first connector means and said output of said first input register being coupled to said second input of said first feedback multiplexer, said second input register having an input, an output and a clock input, said clock input of said second input register being coupled to receive a second input clock signal, said input of said second input register being coupled to said second connector means and said output of said second input register being coupled to said second input of said second feedback multiplexer;

a first and a second input clock multiplexer, said first input clock multiplexer having a first and a second input for receiving a first and a second clock signal and having an output being coupled to said clock input of said first input register to provide said first input clock signal and having a third select line means for selecting between said first and said second clock signals, said second input clock multiplexer having a first and a second input for receiving said first and said second clock signals and having an output being coupled to said clock input for said second input register to provide said second input clock signal and having a fourth select line means for selecting between said first and said second clock signals;

an input multiplexer having an output being coupled to a third input to said programmable array, and having a first and a second input, said first input of said input multiplexer being coupled to said output of said first input register and said second input of said input multiplexer being coupled to said output of said second input register, said input multiplexer having a fifth select line means for selecting between said first input and said second input of said input multiplexer.

4,879,482

LINEAR PULSE MOTOR

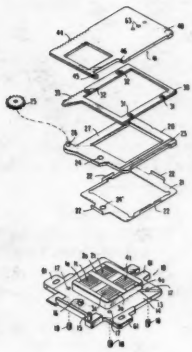
Masanori Murofushi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 30, 1988, Ser. No. 213,864

Claims priority, application Japan, Jun. 30, 1987, 62-164258; Jun. 30, 1987, 62-164259; Jun. 30, 1987, 62-164260; Jun. 30, 1987, 62-164261; Jun. 30, 1987, 62-164263

Int. Cl.[4] H02K *41/03*

U.S. Cl. 310—12 26 Claims



1. A linear pulse motor comprising:

a stationary body having a projecting portion in which magnetic pole members are disposed, and a flat portion surrounding said projecting portion, said magnetic pole members having a plurality of first teeth arranged in an array in a first direction;

a guide member provided on said flat portion of said stationary body and having a first guide groove extending in said first direction;

adjusting members for adjusting a position of said guide member by moving said guide member in directions parallel to and perpendicular to said flat portion; and

a movable body provided above said guide member through a rotatable member which is engaged with said first guide groove, said movable body having a plurality of second teeth which are arranged in an array in said first direction and positioned to face said first teeth at a spacing from said first teeth.

4,879,483

MOLDED MULTI-PART GENERATOR FAN

Manoj M. Barahia, Manchester, Mo., assignor to Century Electric, Inc., St. Louis, Mo.

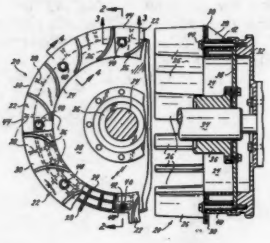
Filed Jun. 3, 1988, Ser. No. 201,886

Int. Cl.[4] H02K *9/06;* F04D *29/28*

U.S. Cl. 310—63 20 Claims

1. In a rotating dynamo electric machine, said dynamo electric machine having a driven member secured to a driving member of said machine, said driven and driving members

comprising a drive train, the improvement comprising a plastic annular fan attached to the drive train said fan including a



plurality of overlying interlocking sectoral fan parts, and said fan having means to cool the machine as the drive train rotates.

4,879,484

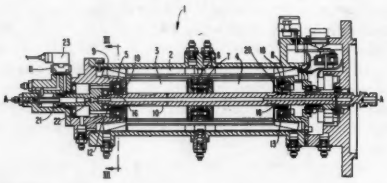
ALTERNATING CURRENT GENERATOR AND METHOD OF ANGULARLY ADJUSTING THE RELATIVE POSITIONS OF ROTORS THEREOF

John B. Huss, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Jun. 17, 1988, Ser. No. 208,114

Int. Cl.[4] H02K *16/00*

U.S. Cl. 310—114 **10 Claims**



1. An alternating current generator comprising stator means having an output winding for producing an output voltage, rotor means within said stator means, said rotor means including first and second magnetic rotors rotatable about a common axis, and means for angularly adjusting said first and second rotors relative to one another about said common axis, said means for angularly adjusting including means for rotating each of said first and second rotors in opposite directions relative to the other for affecting a relative angular adjustment of the rotors, wherein said means for rotating simultaneously rotates each of said rotors a like amount in opposite directions during a relative angular adjustment.

4,879,485

PERMANENT MAGNET ROTOR

Giampiero Tassinario, Florence, Italy, assignor to Mavilor Systemes S.A., Switzerland

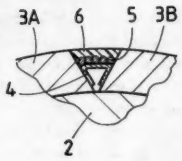
Filed Aug. 25, 1988, Ser. No. 236,996

Claims priority, application Switzerland, Sep. 16, 1987, 3565/87

Int. Cl.[4] H02K *21/12*

U.S. Cl. 310—156 **11 Claims**

1. A permanent magnet rotor for an electric motor, the rotor comprising a cylinder forming its body and provided with a plurality of curved permanent magnets disposed on the periphery of the cylinder, and secured in a predetermined manner to the body of the rotor, wherein the magnets are secured by adhesive bonding to the rotor and spaced apart in the peripheral direction so as to form axial interstices, wherein said interstices are partly filled with continuous tensioned thread of nonmagnetic material which passes from one interstice to



another, passing alternately over plane faces of the rotor, and that the remainder of space in each interstice is filled with a resin.

4,879,486

PERMANENT-MAGNET GENERATOR USED FOR AN IGNITION DEVICE OF AN INTERNAL COMBUSTION ENGINE

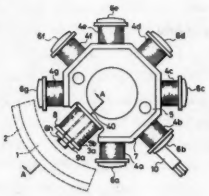
Shigeru Yumiyama, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 6, 1988, Ser. No. 141,146

Claims priority, application Japan, Jan. 21, 1987, 62-9872

Int. Cl.[4] F02P *1/02*; H02K *37/12*

U.S. Cl. 310—254 **1 Claim**



1. A permanent-magnet generator used for an ignition device of an internal combustion engine comprising:

a rotor fitted on a rotational driving shaft of the internal combustion engine and mounted for rotation about an axis;

permanent magnets on a circumference of the rotor;

a stator core having a plurality of salient poles facing toward the permanent magnets of the rotor each with a coil positioned around the outer periphery of each salient pole; and

a plurality of salient pole wound coils for charging a condenser used for ignition arranged in steps along an axial direction of said stator core;

wherein axial lengths along a radial direction with respect to the rotational axis of said plurality of salient pole wound coils are longer than the corresponding lengths of the other salient pole wound coils on said stator core.

4,879,487

SURFACE-ACOUSTIC-WAVE DEVICE

Kazuyoshi Sugai; Kiyotaka Sato, and Hiroshi Nishizato, all of Tokyo, Japan, assignors to Clarion Co., Ltd., Tokyo, Japan

Filed May 19, 1988, Ser. No. 196,123

Claims priority, application Japan, May 26, 1987, 62-130618; May 26, 1987, 62-130619

Int. Cl.[4] H01L *41/08*

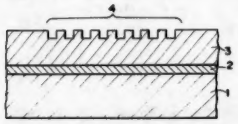
U.S. Cl. 310—313 A **6 Claims**

1. A surface-acoustic-wave device comprising:

a semiconductor substrate;

a piezoelectric layer provided on one surface of said semiconductor substrate;

a glassy layer provided on one surface of said piezoelectric layer on a side of said piezoelectric layer remote from said substrate; and



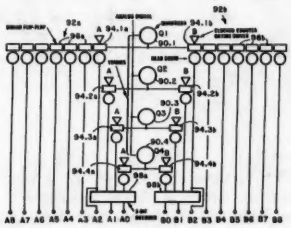
a plurality of grooves which are spaced periodically and which are provided in a surface of said glassy layer located on a side thereof remote from said piezoelectric layer, said grooves extending transversely with respect to a surface acoustic wave travelling direction.

4,879,488

VERNIER FOR SUPERCONDUCTING ANALOG-TO-DIGITAL CONVERTER

Arnold H. Silver, Rancho Palos Verdes, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed May 6, 1988, Ser. No. 190,965
Int. Cl.[4] H03M *1/00*
U.S. Cl. 341—171 **14 Claims**



7. A superconducting analog-to-digital converter, comprising:

a plurality of (2^n) of quantizers in the form of superconducting quantum interference devices (SQUID's), where n is a positive integer, configured to generate voltage pulses at periodically spaced quantization levels of an analog signal current applied to the quantizers, adjacent current quantization levels being separated by a uniform current quantum of Δi, where Δi is the change in analog signal current between adjacent quantization levels associated with any one of the quantizers;

means for supplying substantially equal analog signal currents to the plurality of quantizers;

means for applying a different bias current to each of the plurality of quantizers, such that the quantization levels are offset from each other in a uniform manner to provide for interpolation between adjacent quantization levels of a single quantizer, the quantizer bias currents having respective values of 0, $\Delta i/2^n$, $2\Delta i/2^n$, and so forth up to $(2^n-1)\Delta i/2^n$; and

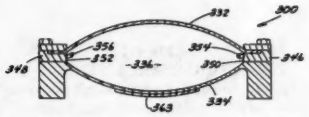
means for monitoring the voltage pulses output by the quantizers to determine the digital equivalents of changes in the analog signal current, to obtain a set of quantization levels interleaved between normally spaced quantization levels thereby permitting increased resolution or an increased sampling rate from the converter.

4,879,489

RADIATION-EMITTING DEVICES

Paul R. Goudy, Jr., Bayside, Wis., assignor to Photo Redux Corp., Milwaukee, Wis.

Division of Ser. No. 827,549, Feb. 10, 1986, Pat. No. 4,721,875.
This application Jan. 25, 1988, Ser. No. 147,499
Int. Cl.[4] H01J *61/30, 61/52*
U.S. Cl. 313—15 **20 Claims**



1. In a radiation-emitting device of the type having an envelope, a gas contained within the envelope, and spaced electrode means within the envelope, the improvement comprising:

said envelope including a first elongated principal member having an outwardly convex radiation-transmitting unsupported portion which is under compression and substantially free of discontinuities, and a separate inwardly concave second elongated principal member, said principal members being in fixed relative position and defining a volume of substantially constant cross-section along its length, said principal members being configured and located such that said volume is less than that of a cylinder of diameter equal to the largest cross-dimension of said volume;

the second principal member being radiation-reflective;

the first and second principal members together have two pairs of corresponding opposed edges along the length of the envelope volume, said largest inner cross-dimension being substantially equal to the spacing from one pair of opposed edges to the other;

first and second mounting means secured with respect to the principal members and having inward portions facing each other across said volume; and

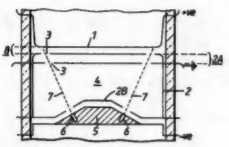
first and second electrode means mounted along the inward portions of the first and second mounting means, respectively.

4,879,490

GAS DISCHARGE DEVICES WHEREIN ELECTRONS ARE INJECTED INTO A HIGH FIELD REGION

Clifford R. Weatherup, Chelmsford, United Kingdom, assignor to English Electric Valve Company Limited, Chelmsford, United Kingdom

Filed Aug. 21, 1987, Ser. No. 87,923
Claims priority, application United Kingdom, Aug. 30, 1986, 8621022; Jul. 29, 1987, 8718005
Int. Cl.[4] H01J *17/46*
U.S. Cl. 313—601 **18 Claims**



1. A gas discharge device comprising, within a gas-filled envelope, an anode, a cathode and means for injecting electrons into a high field region, having no electrodes therein, between said anode and said cathode for initiating a discharge

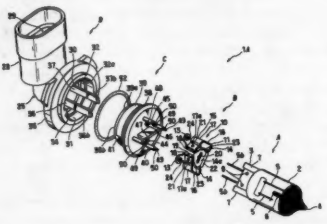
within said high field region, said device acting as a switch for allowing conduction through said device when triggered by said electrons entering said high field region.

4,879,491

ELECTRIC LAMP ASSEMBLY

Yasuo Hirozumi; Susumu Kanematsu; Yasuyoshi Numajiri; Mikio Watanabe, and Mitsuhiro Okano, all of Shizuoka, Japan, assignors to Koito Seisakusho Co., Ltd., Tokyo, Japan

Filed Jul. 6, 1988, Ser. No. 215,537
Claims priority, application Japan, Jul. 6, 1987, 62-168388
Int. Cl.[4] H01J *5/48, 5/50*
U.S. Cl. 313—318 6 Claims



1. An electric lamp assembly comprising:

a bulb unit including a filament, lead lines extending from said filament to the outside of the bulb unit and a hermetic seal portion, said lead lines extending through said hermetic seal portion;

a bulb holder including a looped band portion which grips the hermetic seal portion of the bulb unit having the leading ends of said lead lines projected outward from said bulb holder, said bulb holder having radially outwardly extending foot portions each having at least one opening formed therethrough;

a core structure including a circular plate portion of molded plastic and supporting pins which extend from said circular plate portion, said supporting pins being respectively inserted into said openings of said foot portions of said bulb holder and welded to the foot portions to achieve a tight connection between said core structure and said bulb holder;

a base structure having a hollowed entrance into which said core structure is snugly received, said base structure having two conducting plate members contained therein, said conducting plate members being welded with said lead lines; and

guide means for guiding the leading ends of said lead lines and those of said conducting plate members thereby to facilitate the welding between said conducting plate members and said lead lines upon assembling the electric lamp assembly; and

wherein said guide means comprises:

first means defining in said circular plate portion two slits for receiving the respective leading ends of said conducting plate members; and

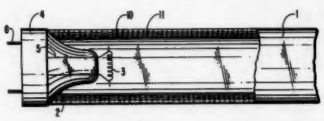
second means defining in said circular plate portion two bores for receiving the respective leading ends of said lead lines, said bores extending along and being merged with said slits respectively.

4,879,492

FLUORESCENT LAMP HAVING A MULTI-LAYER PHOSPHOR OPTIMIZED FOR LUMEN OUTPUT, COLOR RENDERING AND COST

Frank M. Latassa, Morgantown, W. Va., and William E. Wilson, Danvers, Mass., assignors to North American Philips Corp., New York, N.Y.

Filed Sep. 30, 1988, Ser. No. 252,205
Int. Cl.[4] H01J *61/48*
U.S. Cl. 313—487 9 Claims



1. In a fluorescent lamp having a phosphor excited during lamp operation to emit visible light, the improvement comprising:

a first layer comprising a halophosphate phosphor having CIE color coordinates within a four step MacAdam oval centered on X=0.382 and Y=0.384 and exterior to the standard cool white oval;

a second layer of a rare earth activated phosphor having approximately the same color coordinates as said first layer of phosphor and disposed with an area density of at least approximately 2.7 milligrams per square inch and covering said first layer of phosphor;

the ratio of the area density of the rare earth activated phosphor to the area density of the halophosphate-containing phosphor being between 0.088 to 0.222; and

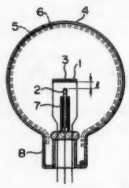
the lamp having a color rendering index equal to at least 60.

4,879,493

LOW-PRESSURE DISCHARGE LAMP

Hiromistu Mastuno, Hachioji; Seiichi Murayama; Tetsuo Ono, both of Kokubunji, and Yoshio Watanabe, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 30, 1987, Ser. No. 126,789
Claims priority, application Japan, Dec. 2, 1986, 61-285853
Int. Cl.[4] H01J *61/22*
U.S. Cl. 313—641 18 Claims



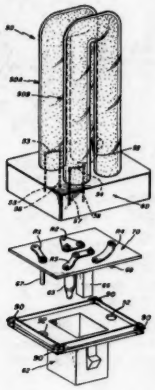
1. A low-pressure discharge lamp comprising a discharge vessel defining an airtight space therein, at least one pair of electrodes disposed in said discharge vessel, one of said electrodes which acts as an anode being located at least partially in a zone of negative glow, and discharge gases enclosed in said discharge vessel including a rare gas as an essential component thereof, said rare gas being selected from the group consisting of argon and krypton, and a lamp voltage of said low-pressure discharge lamp when expressed in volts is between (Vm−2) and (Vm+4), where Vm is the lowest metastable potential of said rare gas.

4,879,494

FLUORESCENT LAMP STARTER ASSEMBLY

Billy W. Tuttle, Williamsport, Pa., assignor to GTE Products Corporation, Danvers, Mass.

Filed Feb. 26, 1987, Ser. No. 19,389
Int. Cl.[4] H01J *17/34*
U.S. Cl. 315—61 **18 Claims**



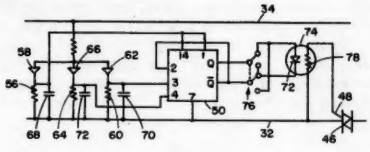
1. In a fluorescent lamp including a fluorescent tube having electrode means supported therein, and a base from which the fluorescent tube is supported, a circuit board assembly for support in said lamp base and comprising; a lamp starter circuit, a circuit board having conductive runs thereon, pin means extending outside from within said base for enabling energy coupling to said electrode means, means for supporting the pin means from said circuit board, means connecting the lamp starter circuit to the circuit board conductive runs, and means connecting the lamp electrode means to the circuit board conductive runs.

4,879,495

ILLUMINATION CONTROL METHODS AND MEANS

Yujiro Yamamoto, 1201 Via La Jolla, San Clemente, Calif. 92672

Filed Oct. 6, 1986, Ser. No. 915,781
Int. Cl.[4] H05B *37/00*
U.S. Cl. 315—362 **5 Claims**



1. A fluorescent tube lighting system comprising, in combination:

a plurality of fluorescent lamps;

an energizing circuit for supplying electrical energy to said lamps in parallel from a common source;

a first switch and a second switch, each of said switches being effective in one state of actuation to interrupt, and in another state of actuation not interrupt, a circuit in which connected;

said first switch being connected in series in said energizing circuit with each of said lamps;

said second switch being connected in series in said energizing circuit with less than all of said lamps; and

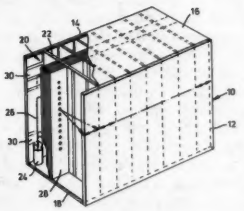
said second switch being responsive to a predetermined change in the state of said first switch to change the state of said second switch in that said second switch is responsive to change state from said one state to said other state in response to the second change of state from said one to said other state in said first switch provided that the second change of state in the first switch occurs within a predetermined time interval following a preceeding change of state in said first switch.

4,879,496

DISPLAY TUBE

Alan G. Knapp, Crawley; Daphne L. Lamport, Caterham; Derek Washington, Wallington, and Alfred W. Woodhead, Caterham, all of United Kingdom, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 437,583, Oct. 29, 1982, abandoned. This application Apr. 9, 1986, Ser. No. 850,441
Claims priority, application United Kingdom, Nov. 9, 1981, 8133688
Int. Cl.[4] H01J *29/70*
U.S. Cl. 315—366 **12 Claims**



1. A flat panel display tube comprising an evacuated envelope having substantially flat, parallel, spaced-apart front and rear walls and a plurality of support members extending between the front and rear walls for substantially the full height of the envelope, said support members dividing the interior of the envelope into a plurality of modules, said front wall comprising a glass faceplate supporting a luminescent screen on an interior surface thereof;

characterized in that each module includes an arrangement for minimizing divergence of an electron beam propagating therein, comprising:

(a) means for producing a low current electron beam, said means being arranged to direct said electron beam along a first path substantially parallel to the rear wall;

(b) first deflection means in the rear of the envelope for deflecting the electron beam from the first path into one of a plurality of substantially parallel second paths extending toward the screen;

(c) second deflection means disposed along one of said first and second paths to effect scanning of the beam transverse to said path; and

(d) a channel plate electron multiplier extending transversely to the second path and includig a multiplicity of electron-multiplying channels, each disposed to receive electrons from the low current electron beam as it travels along a respective one of the second paths, and to produce a high current electron beam traveling along the second path toward the screen.

4,879,497

METHOD AND DEVICE FOR MEASURING THE TEMPERATURE OF A BRUSHLESS D-C MOTOR

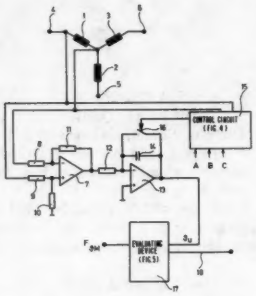
Helmut Meyer, Dossenheim, and Jürgen Seeberger, Heidelberg, both of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Oct. 27, 1988, Ser. No. 263,001

Claims priority, application Fed. Rep. of Germany, Oct. 27, 1987, 3736303

Int. Cl.[4] H02K *29/00*

U.S. Cl. 318—254 **8 Claims**



1. Method for determining the temperature of a brushless d-c motor with a permanent-magnet rotor and an at least three-phase winding with electronic commutation, which comprises determining the curve of an EMF induced in a winding during one phase wherein the winding is in currentless condition, and evaluating the temperature therefrom.

6. Device for determining the temperature of a brushless d-c motor with a permanent-magnet rotor and an at least three-phase winding, with electronic commutation, comprising an integrator having an input for receiving an EMF induced in the winding, a control device connected to said integrator for starting integration at an instant of zero passage of the EMF and for stopping the integration at the beginning of a subsequent commutation signal, and a circuit post-connected to said integrator for storing the integral of the EMF within a measuring time period in the form of a temperature-proportional signal.

4,879,498

DC MOTOR DRIVE SYSTEM FOR REDUCING START-UP CURRENT

Tooru Shinohara, and Masahito Iwatsubo, both of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

PCT No. PCT/JP87/00585, § 371 Date Jun. 6, 1988, § 102(e) Date Jun. 6, 1988, PCT Pub. No. WO88/01111, PCT Pub. Date Feb. 11, 1988

PCT Filed Aug. 5, 1987, Ser. No. 184,496

Claims priority, application Japan, Aug. 6, 1986, 61-184830

Int. Cl.[4] H02P *6/02*

U.S. Cl. 318—254 **26 Claims**

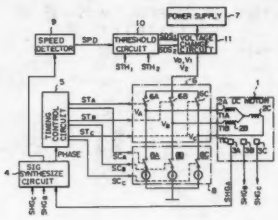
1. A direct-current motor drive system comprising:

a DC motor;

means, connected to said DC motor, for detecting a rotation of a rotor of said DC motor and outputting a rotational signal;

power supply means, connected to said DC motor, for supplying drive power to said DC motor;

current drive means, operatively connected to a coil of said DC motor and providing a constant current passing through said coil supplied with the drive power during a normal operatin of said DC motor, said power supply means receiving the rotational signal from said rotational detecting means, and sequentially increasing a voltage therefrom in multi-steps in response to the increase of the rotational signal during a start-up operation of said DC motor, a current defined by said voltage and passing



through said current drive means being reduced to a value less than a predetermined value.

4,879,499

INDUSTRIAL ROBOT'S ARTICULATE DEVICE

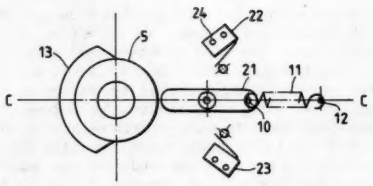
Masanari Iwata, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 1, 1988, Ser. No. 239,371

Claims priority, application Japan, Sep. 1, 1987, 62-216373

Int. Cl.[4] B25J *19/06*

U.S. Cl. 318—568.16 **7 Claims**



1. An industrial robot's articulate device, comprising:

first means constituted by one of a first arm and a base;

second means constituted by a second arm, which is rotatably connected to said first means;

an electric motor provided on said first means for rotating said second means;

a transmission shaft rotatably supported by said first means for transmitting the output of said electric motor to said second means; and

a detecting mechanism for detecting the position of said second means with respect to said first means, said detecting mechanism including a dog secured to said transmission shaft, a swing lever swingably coupled to said first means to pose in alternative postures according to the directions of rotation of said dog, and detecting means for detecting the alternative postures of said swing lever.

4,879,500

CONTROLLER FOR MAGNETIC BEARING SYSTEM

Yoichi Kanemitsu, Kanagawa, Japan, assignor to Ebara Research Co., Ltd., Fujisawa and Ebara Corporation, Tokyo, both of, Japan

Filed Dec. 19, 1988, Ser. No. 286,013

Int. Cl.[4] G05D *23/275*

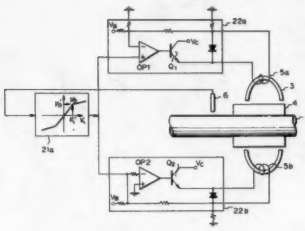
U.S. Cl. 318—632 **5 Claims**

1. A controller for a magnetic bearing system of the type having a rotor yoke made of a magnetic material which is rigidly secured to a rotary shaft, a pair of electromagnet stators rigidly secured to a casing with a minute gap provided between the same and said rotor yoke, each stator having a coil

for generating magnetomotive force, a displacement sensor for measuring relative displacement between said rotary shaft and said casing, and a combination of a compensation circuit and a power amplifier for controlling the level of magnetic attraction force acting between said rotor yoke and said pair of electromagnet stators on the basis of a signal output from said displacement sensor, said controller comprising:

said power amplifier including two operational amplifiers which are supplied with a signal output from said compensation circuit and two power transistors for amplifying the respective outputs of said operational amplifiers,

wherein the signal output from said compensation circuit is input to both the non-inverting input terminal of one of said operational amplifiers and the inverting input terminal of the other operational amplifier, and an exciting coil bias voltage is input to the respective inverting input terminals of the two operational amplifiers in parallel to said input signal.



4,879,501

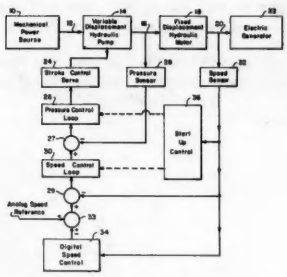
CONSTANT SPEED HYDROSTATIC DRIVE SYSTEM

Lambert Haner, Rocky River, Ohio, assignor to Commercial Shearing, Inc., Youngstown, Ohio

Filed Dec. 10, 1982, Ser. No. 448,648

Int. Cl.[4] G05D *16/00*

U.S. Cl. 318—645 **12 Claims**



1. A constant speed generator drive system adapted for use with a variable speed engine comprising:

a. a variable displacement hydraulic pump connected to a powered rotating shaft;

b. a hydraulic motor;

c. hydraulic lines operatively connecting said hydraulic motor to said hydraulic pump;

d. a drive shaft connecting said hydraulic motor to an electrical generator;

e. means for controlling the displacement of said hydraulic pump relative to the magnitude of a direct current signal applied thereto;

f. means for delivering a direct current signal to said displacement controlling means responsive to the hydraulic pressure in said hydraulic lines;

g. speed sensor means;

h. means for controlling the rotational speed of said drive shaft relative to said speed sensor means;

i. timing reference means; and

j. digital trim control means for adjusting said speed sensor means to correspond to said timing reference means.

4,879,502

SPEED CONTROL APPARATUS AND METHOD FOR MOTORS

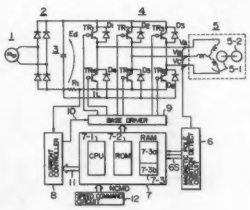
Tunehiro Endo, Hitachiota; Nobuaki Kato, Katsuta; Kenichi Iizuka, Ashikaga, and Fumio Tajima, Ibaraki, all of Japan, assignors to Hitachi, Ltd. and Hitachi Engineering Co., Ltd., both of Tokyo, Japan

Continuation of Ser. No. 822,258, Jan. 24, 1986, abandoned. This application May 10, 1988, Ser. No. 192,357

Claims priority, application Japan, Jan. 28, 1985, 60-12592; May 31, 1985, 60-116451

Int. Cl.[4] H02P *5/40*

U.S. Cl. 318—723 **12 Claims**



1. A speed control apparatus for a motor which drives a load device with a periodical change of its load in response to a speed command, comprising:

a control unit for controlling current or voltage supplied to said motor from a power source on the basis of a current command or voltage command corresponding to a desired speed of said motor;

means for dividing each period of said change of load into at least n divisions, where n=2;

means for detecting motor speed at each of said n divisions;

read/write storage means for independently storing n pieces of current command data or voltage command data corresponding to said n divisions;

means for comparing said speed command with said motor speed detected by said detecting means to determine the deviation between said motor speed and said speed command and for then rewriting said data in said storage means at each of said n divisions in accordance with the determined deviation so as to decrease the deviation; and

means for producing said current command or said voltage command according to said current command data or said voltage command data at each of said n divisions so as to provide said current command or said voltage command to said control unit.

4,879,503

BLOWER MOTOR CONTROL FOR AN AIR CONDITIONER

Hideki Aoki; Mitsuru Murata, and Hirotaka Sakamoto, all of Shizuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaihsa, Tokyo, Japan

Filed Aug. 24, 1988, Ser. No. 235,480

Claims priority, application Japan, Aug. 24, 1987, 62-209861

Int. Cl.[4] H20P *5/40*

U.S. Cl. 318—809 **6 Claims**

1. A blower motor control for an air conditioner, said air

conditioner including an ac motor for driving an air circulating blower comprising:

rotation speed detecting means for detecting a rotation speed of the motor;

a means for supplying AC power to the motor;

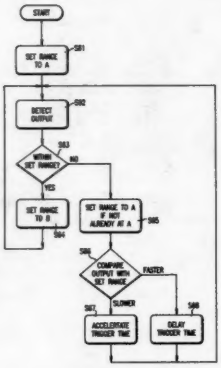
zero cross timing detecting means for detecting zero cross timing of the power source voltage;

phase shifting means for shifting the phase of the voltage supplied to the motor;

output determining means for comparing the rotation speed detected by the rotation speed detecting means to a set target rotation speed to determine a conduction angle for the motor;

phase control output means for controlling the phase shifting means based on the conduction angle determined by the output determining means and the output from the zero cross timing detection means; and

means for outputting the rotation speed from the rotation speed detecting means when the detected speed is not within a present allowable deviation range (A) which is centered with respect to the target rotation speed, and for resetting the output determining means to a new conduction angle for bringing the actual rotation speed closer to



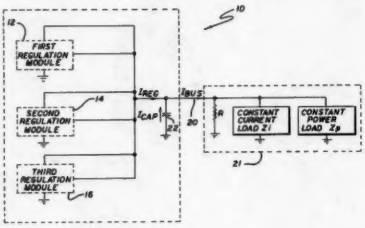
the target rotation speed and for outputting the new conduction angle to the phase control output means; and further for, when the actual rotation speed is within the range (A), outputting from the determining means the same conduction angle as the previous one and for changing the allowable deviation range centered with respect to the target rotation speed in the output determining means from the range (A) to a new allowable deviation range (B) which is wider than the range (A) and yet further for when the rotation speed detected by the rotation speed detecting means is within the range (B) for outputting the same angle as the previous one to the phase control output means; and for after the allowable deviation range has changed from the range (A) to the range (B), when the actual rotation speed is not within the range (B), for causing the output determining means to set a new conduction angle for bringing the actual rotation speed closer to the target rotation speed and for outputting the new conduction angle to the phase control output means, and for centering the allowable deviation range with the target rotation speed in the output determining means from the range (B) to the range (A) which is narrower than the range (B).

4,879,504

DIGITAL SWITCHING VOLTAGE REGULATOR HAVING TELESCOPED REGULATION WINDOWS

Michael J. McVey, Manhattan Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Sep. 15, 1988, Ser. No. 244,378
Int. Cl.[4] G05F *1/46*
U.S. Cl. 323—272 **16 Claims**



1. A digital switching voltage regulator comprising:

first voltage regulation module means for regulating, within a first voltage regulation window defined by first upper and lower threshold voltages, the voltage across a load operatively coupled to said regulator in response to a first current level drawn by said load and

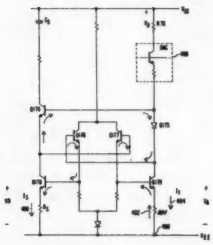
second voltage regulation module means for regulating said load voltage within a second voltage regulation window in response to a second current level drawn by said load, said second window being centered within said first window about a common load voltage and being defined by second upper and lower threshold voltages, said second upper threshold voltage being lower than said first upper threshold voltage and said second lower threshold voltage being higher than said first lower threshcld voltage.

4,879,505

TEMPERATURE AND POWER SUPPLY COMPENSATION CIRCUIT FOR INTEGRATED CIRCUITS

Jeffrey G. Barrow, Oak Ridge, N.C., and Adrian P. Brokaw, Burlington, Mass., assignors to Analog Devices, Inc., Norwood, Mass.

Division of Ser. No. 945,654, Dec. 23, 1986, Pat. No. 4,742,331.
This application May 2, 1988, Ser. No. 189,284
Int. Cl.[4] G05F *3/08*
U.S. Cl. 323—312 **16 Claims**



1. In an electronic circuit having a monolithic integrated circuit with at least one integrated resistor with a first temperature coefficient and having a resistor external to said integrated circuit with a second temperature coefficient different from said first temperature coefficient, the improvement comprising an integrated bias circuit for deriving a current from said

external resistor which current is compensated for temperature-induced changes in the value of said integrated resistor, said bias circuit comprising

means for passing a current which varies with said temperature-induced changes in the value of said integrated resistor through said integrated resistor to develop a voltage which is independent of said temperature induced changes in the value of said integrated resistor,

means for sensing said voltage developed across said integrated resistor, and

means for producing a voltage across said external resistor which is proportional to said voltage developed across said integrated resistor.

4,879,506

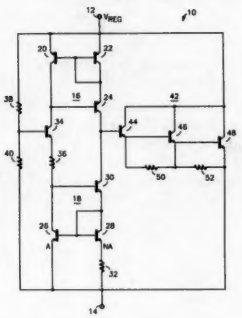
SHUNT REGULATOR

Jeffrey J. Braun, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 2, 1988, Ser. No. 227,384

Int. Cl.[4] G05F *3/20*

U.S. Cl. 323—314 **2 Claims**



1. An integrated shunt regulator for providing a regulated voltage at an output thereof, comprising:

a first current mirror having a common terminal coupled to the output of the shunt regulator, and first and second terminals at which first and second currents are supplied;

a second current mirror having first and second terminals coupled to said first and second terminals of said first current mirror respectively and a common terminal, and including first and second transistors having a base, collector and emitter and operated at different current densities such that a voltage is produced there between having a positive temperature coefficient;

a first resistor coupled in series to the emitter of one of said first and second transistors across which said positive temperature voltage is developed;

a third transistor having a base, a collector coupled to said first terminal of said first current mirror and an emitter coupled to said first terminal of said second current mirror via said second resistor wherein a voltage is developed at said base which is a function of the current flowing in said first resistor; and

a resistive divider coupled between the output of the regulator and said common terminal of said second current mirror and to said base of said third transistor for establishing the regulated voltage the magnitude of which is proportional to said voltage developed at said base of said third transistor.

4,879,507

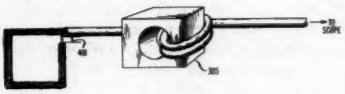
NOISE MEASUREMENT PROBE

Douglas C. Smith, Rumson, N.J., assignor to American Telephone and Telegraph Company, New York, N.Y. and AT&T Information Systems Inc., Morristown, N.J.

Filed Dec. 23, 1988, Ser. No. 289,288

Int. Cl.[4] G01R *19/55*

U.S. Cl. 324—57 N **14 Claims**



1. A probe for use with electrical measurement apparatus, said probe comprising

a plurality of electrical conductors, at least one of said conductors being adapted to couple a signal between an end of said probe and said apparatus and at least one other of said conductors being adapted to couple ground between said probe end and said apparatus; and

at least one loop of an electrically conductive material formed at said end, said loop connecting said one of said conductors to said other one of said conductors, said loop including a portion which is substantially straight and has a length sufficiently small to enable said portion to pick up signals from a circuit under test by magnetic induction and to determine which conductors in a group of such conductors in said circuit under test conduct a noise signal.

4,879,508

CAPACITANCE-TYPE MEASURING DEVICE FOR ABSOLUTE MEASUREMENT OF POSITIONS

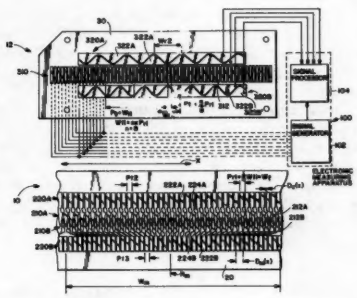
Nils I. Andermo, Kirkland, Wash., assignor to Mitutoyo Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 30,346, Mar. 26, 1987, abandoned, Ser. No. 31,049, Mar. 26, 1987, abandoned, and Ser. No. 35,859, Apr. 8, 1987, abandoned. This application May 31, 1988, Ser. No. 200,368

Claims priority, application Japan, Apr. 4, 1986, 61-078948; Apr. 4, 1986, 61-078947; Apr. 9, 1986, 61-083205; Apr. 11, 1986, 61-083470; Apr. 15, 1986, 61-087839

Int. Cl.[4] G01R *27/26;* G08C *19/16*

U.S. Cl. 324—61 R **32 Claims**



1. Capacitive-type measuring apparatus comprising:

first and second support members, said support members being relatively displaceable with respect to each other, and at least one of said support members being displaceable relative to a measurement axis;

an array of first transmitter electrodes disposed on said first support member in alignment with said measurement axis;

an array of first receiver electrodes disposed on said second support member in alignment with said measurement axis

and such that differing portions of said first receiver electrode array are capacitively coupled with said first transmitter electrode array in dependence on the relative positions of said supporting members; and

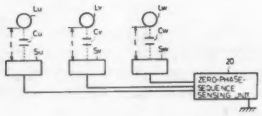
an array of second transmitter electrodes disposed on said second support member in relative alignment with said first receiver electrode array, each of said second transmitter electrodes being electrically connected to a corresponding one of said first receiver electrodes so as to be offset from the corresponding first receiver electrode by an amount which is a predetermined function of the position of the second transmitter electrode relative to a reference position on said measurement axis.

4,879,509

ZERO-PHASE-SEQUENCE VOLTAGE SENSING APPARATUS

Taro Sometani, Hamamatsu; Naotoshi Takaoka, Aichi; Mitsuo Aida, Komaki; Mitsuharu Kudomi, Konan; Yasuhiro Tanahashi, Gifu, and Katsunori Aoki, Inuyama, all of Japan, assignors to Energy Support Corporation, Aichi, Japan

Division of Ser. No. 923,560, Oct. 27, 1986, Pat. No. 4,804,922.
This application Oct. 24, 1988, Ser. No. 261,441
Claims priority, application Japan, Nov. 1, 1985, 60-246763; Nov. 9, 1985, 60-251495; Nov. 9, 1985, 60-251496
Int. Cl.[4] G01R *19/00;* **H02H** *3/26*
U.S. Cl. 324—108 **5 Claims**



1. A zero-phase-sequence voltage sensing apparatus for distribution lines comprising:

a plurality of voltage sensors, each disposed with an insulation space to a corresponding distribution line for sensing a voltage on the corresponding distribution line, each said sensor including an amplifier circuit for outputting a signal having a waveform similar to that of a displacement current from

the corresponding distribution line, and a filter circuit for extracting a signal having predetermined frequencies from said amplifier circuit and outputting a signal having an alternating current waveform similar to the potential of the corresponding distribution line; and

a zero-phase sensing unit including an adder circuit for synthesizing the output signals from the respective voltage sensors and producing a zero-phase-sequence voltage signal, said adder circuit including operational amplifier means for synthesizing output signals from each of the plurality of voltage sensors and for generating a zero-phase-sequence voltage signal.

4,879,510

ELECTRICAL INDICATOR HAVING AN OPTICAL POSITION ENCODER

Akio Itoh, Saitama, Japan, assignor to Jeco Co., Ltd., Japan

Filed Dec. 23, 1987, Ser. No. 137,462
Claims priority, application Japan, Dec. 27, 1986, 61-202461[U]
Int. Cl.[4] G01R *1/20, 5/20, 11/30*
U.S. Cl. 324—150 **11 Claims**

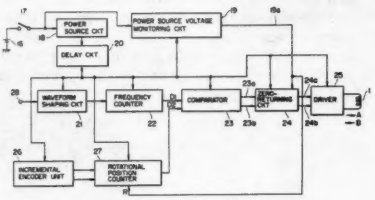
1. An indicator responsive to a received input signal comprising:

an indicating member;

indicating member driving means for rotating said indicating member in response to an electrical signal;

an encoder plate mechanically linked to said indicating member and rotatable therewith;

rotational position detecting means responsive to the rotation of said encoder plate to generate an encoded signal



corresponding to the rotational position of said indicating member; and

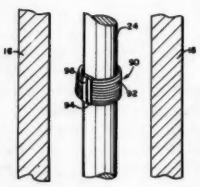
indication position control means responsive to the received input signal and said encoder signal to generate said electrical signal activating said indicating member driving means to rotate said indicating member to the position indicated by the received input signal.

4,879,511

FLAT, MULTICONDUCTOR CABLE COIL DEVICE FOR IN SITU DETECTING OF AXIAL MOTION OF A GENERALLY CYLINDRICAL MEMBER

Robert L. Leon, Roslyn, Pa., assignor to Liberty Technology Center, Inc., Conshohocken, Pa.

Division of Ser. No. 87,541, Aug. 20, 1987, Pat. No. 4,805,451.
This application Oct. 31, 1988, Ser. No. 265,082
Int. Cl.[4] G01P *3/52;* **F16K** *37/00;* **H01F** *27/28*
U.S. Cl. 324—163 **4 Claims**



1. A device for in situ detecting of axial motion of a generally cylindrical member in which both ends of the member are unavailable for the installation of a prewound coil, the device comprising:

a predetermined length of generally flat, multiconductor cable;

a first connector component secured to one end of the cable, the first connector component having a plurality of electrical contacts, the number of contacts being at least two greater than the number of conductors of the cable;

a second connector component secured to the other end of the cable, the second connector component having a plurality of electrical contacts, the number of contacts being at least two greater than the number of conductors of the cable, the two connector components being interconnected with the cable surrounding the cylindrical member so that the contacts of the first and second connector components interengage to connect together predetermined conductors of the cable to form two generally parallel, independent coils extending around the cylindri-

cal member, the ends of the coils being located on the first and second connector components and accessible for external connection;

a current source electrically connected to the accessible ends of one of the coils for imparting current flow through the one coil; and

display means electrically connected to the accessible ends of the other of the coils for receiving induced voltages proportional to the velocity of axial movement of the cylindrical member through the coils and for indicating the received voltages as an indication of the velocity of axial motion of the cylindrical member.

4,879,512

CIRCUIT FOR PROCESSING A PSEUDO-OSCILLATORY SIGNAL, ESPECIALLY FOR INDUCTIVE PROXIMITY DETECTORS

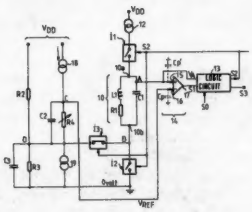
Didier Leonard, Hiersac; Jean-Marie Periot, La Couronne, and Pierre Petit, Champniers, all of France, assignors to La Telemecanique Electrique, France

Filed Apr. 22, 1988, Ser. No. 184,852

Claims priority, application France, Apr. 23, 1987, 87 05960

Int. Cl.[4] G01B *7/14;* **G01D** *5/20*

U.S. Cl. 324—207 **5 Claims**



1. An inductive proximity detector comprising:

(i) an oscillating circuit having a capacitor and a coil connected together between a hot point terminal and a reference terminal;

(ii) a power supply source having a hot point terminal at a first potential and a reference terminal at a second potential substantially lower than said first potential, and a first controllable switch connecting said hot point terminal of the source to the hot point terminal of the oscillating circuit, said first switch having a first control input;

(iii) a comparator comparing the voltage at the hot point terminal of the oscillating circuit with a predetermined reference voltage level for generating at an output thereof output square waves signals indicative of the damping of the oscillating circuit as a function of the distance of an object to be detected;

(iv) logic circuit means having a first input connected to said hot point terminal, a second input connected to the output of the comparator, a third input receiving periodic pulses for initializing charge-discharge cycles of the oscillating circuit and an output connected to said first control input for applying to said first control input further square wave signals controlling the opening and closing of the first switch;

(v) a second controllable switch having a second control input connected to the output of the logic circuit means, and

(vi) further circuit means generating and applying to said reference terminal of the oscillating circuit a further potential substantially equal to half of said first potential when the second switch is open, said second switch connecting the said reference terminal of the oscillating circuit to the power supply reference terminal at said second potential and thus applying said second potential to the reference terminal of the oscillating circuit when the second switch is closed.

4,879,513

DEVICE FOR MEASURING PAPER OR THE LIKE LYING ON A SUPPORT

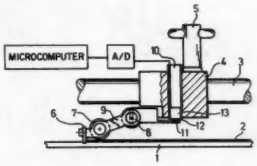
Nikolaus Spiegel, Walldorf; Karlheinz Krestyn, Leimen, and Theobald Blaser, Dielheim, all of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Feb. 19, 1988, Ser. No. 158,230

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1987, 3705304

Int. Cl.[4] B65H *7/12;* **G01B** *7/06;* **G01D** *3/02*

U.S. Cl. 324—207 **9 Claims**



1. Device for measuring the thickness of paper lying on a support by engaging the sheet at only one location, the device having a pull guide arranged above the paper including a pivot bearing with a lever formed of two arms rigidly mounted thereon, and a pull roller located at an end of one arm of the lever and engageable at the one location with the surface of a sheet of the paper arriving on the support, the pull guide also comprising distance measuring means located at the end of the other arm of the lever for measuring a movement executed by the lever for issuing a signal in proportion with the magnitude of the distance traversed by said movement, and means connected to said distance measuring means for electronically evaluating said signal.

4,879,514

MAGNETIC RESONANCE IMAGING DEVICE COMPRISING A DIGITAL TRANSMITTER/RECEIVER

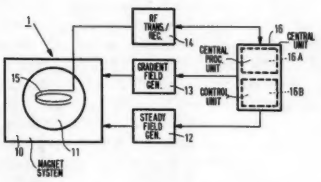
Antoon F. Mehlkopf, and Johannes H. Den Boef, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 19, 1988, Ser. No. 196,534

Claims priority, application Netherlands, May 19, 1987, 8701195

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 **10 Claims**



1. A magnetic resonance imaging device comprising a magnet system for generating a steady, uniform magnetic field and gradient magnetic fields in a measurement space, a transmitter/receiver including a transmitter section for generating modulated RF signals for exciting magnetic resonance signals in said measurement space in successive measurement sequen-

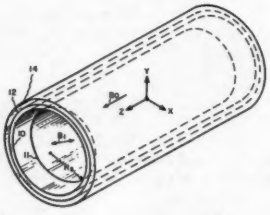
ces, said excited magnetic resonance signals being characterized by a frequency band, means for generating a reference signal having a frequency in the neighborhood of but outside said frequency band, a receiver section for detecting received magnetic resonance signals within said frequency band by mixing said received magnetic resonance signals with said reference signal to form demodulated magnetic resonance signals and a sampling circuit for sampling the demodulated magnetic resonance signals, the frequency of the sampling circuit being chosen so tha the frequency band of the sampled demodulated magnetic resonance signal is situated to only one side of the frequency 0 Hz, and means for retaining synchronization of phase information in the sampled demodulated magnetic resonance signals in the successive measurement sequences.

4,879,515

DOUBLE-SIDED RF SHIELD FOR RF COIL CONTAINED WITHIN GRADIENT COILS OF NMR IMAGING DEVICE

Peter B. Roemer, and William A. Edelstein, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 22, 1988, Ser. No. 288,344
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—318 **4 Claims**



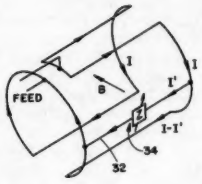
1. A radio-frequency (RF) shield, for use interposed between a set of gradient coils and at least one RF coil in an NMR imaging device, comprises: a member of a laminate, having a dielectric sheet between a pair of conductive sheets, formed into a cylinder with a different one of said sheets forming a different one of interior and exterior conductive surfaces; each surface having opposed first and second half-cylinders with each half-cylinder having a like plurality of conductive streamline loop portions which are each defined by at least one non-conductive cut line etched through the sheet, between each pair of adjacent loop portions and parallel to RF current flow induced therein; and each half-cylinder having a single radial cut line separating each loop portion thereof into a generally C-shaped conductive loop portion and substantially opposite to the cut line in the same half-cylinder in the opposite one of the exterior and interior surfaces, to cause a pair of capacitive elements of maximized value to be present in series in each loop to provide a set of essentially short circuits for any RF current induced in either conductive sheet of the shield by the field of the at least one RF coil, while passing any field from said gradient coil set in substantially unattenuated manner.

4,879,516

PRECISION ELECTRICAL ADJUSTMENT OF QUADRATURE COIL ISOLATION

Mehrdad Mehdizadeh, University Hts.; John L. Patrick, Euclid, and George J. Misic, Novelty, all of Ohio, assignors to Picker International, Inc., Highland Hts., Ohio

Continuation-in-part of Ser. No. 120,475, Nov. 13, 1987, Pat. No. 4,839,594, and a continuation-in-part of Ser. No. 86,277, Aug. 17, 1987, Pat. No. 4,841,248, and a continuation-in-part of Ser. No. 931,726, Nov. 17, 1986, Pat. No. 4,752,738, and a continuation-in-part of Ser. No. 765,708, Aug. 14, 1985, Pat. No. 4,793,356. This application May 26, 1988, Ser. No. 199,202
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—318 **15 Claims**



1. A magnetic resonance apparatus comprising:
a main magnetic field means for generating a main magnetic field;
a radio frequency transmitter for transmitting radio frequency signals;
a radio frequency receiver for receiving radio frequency magnetic resonance signals;
a quadrature coil assembly mounted adjacent the magnetic field and operatively connected with at least one of the radio frequency transmitter and receiver, the quadrature coil assembly including a first coil, a second coil, and a shunt path for adjusting relative isolation of the first and second coils, at least one of the first and second coils being a saddle coil, under a constant current, the first coil generates a magnetic field in a first direction and the second coil generates a magnetic field in a second direction, the first and second directions being at a generally perpendicular angle relative to each other; and
a means for adjusting current flow along the shunt path such that the shunt path current adjusting means adjusts the relative angle of the first and second directions.

4,879,517

TEMPERATURE COMPENSATION FOR POTENTIOMETRICALLY OPERATED ISFETS

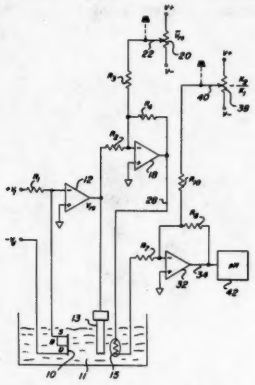
James G. Connery, Ambler, and Earl W. Shaffer, Jr., Lansdale, both of Pa., assignors to General Signal Corporation, Stamford, Conn.

Filed Jul. 25, 1988, Ser. No. 224,510
Int. Cl.[4] G01N *27/56*
U.S. Cl. 324—438 **20 Claims**

2. Apparatus for determining the pIon activity of a sample, comprising:
a potentiometrically operated ISFET probe for immersion in said sample, said ISFET producing a change in its output signal in response to changes in the ion activity of said sample;
means for operating said ISFET at a constant drain-source voltage and a particular drain-source current which is independent of the characteristics of said ISFET
subtracting means for subtracting from said ISFET output signal a signal representative of the isopotential voltage of the probe at said constant current;
a temperature sensitive probe having a characteristic which is responsive to the temperature of the sample upon immersion in the sample;

means for producing a modification of the output of said first subtracting means, said modification being in accordance with the product of the Nernst factor and the absolute temperature of the sample as represented by the temperature responsive characteristic of said temperature sensitive probe; and

adding means for further modifying the modified output of



the subtracting means by adding a quantity representative of the isopotential pIon value of the probe, whereby the output of the adding means is a signal indicative of the pIon value of the sample which is independent of changes in the temperature of the sample.

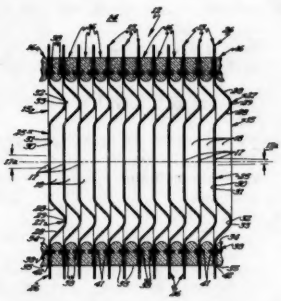
4. Apparatus in accordance with claim 2 in which said temperature sensitive probe is a negative temperature coefficient thermistor.

4,879,518

LINEAR PARTICLE ACCELERATOR WITH SEAL STRUCTURE BETWEEN ELECTRODES AND INSULATORS

John H. Broadhurst, Golden Valley, Minn., assignor to Sysmed, Inc., Eden Prairie, Minn.

Filed Oct. 13, 1987, Ser. No. 107,093
Int. Cl.[4] H05H *9/00, 5/02*
U.S. Cl. 328—233 **7 Claims**



1. A linear accelerator including a vacuum chamber, a pressure chamber exteriorly of the vacuum chamber, source means for producing a directed beam of charged particles inside the vacuum chamber, a target against which the beam of charged particles is directed,

a plurality of similar circular electrodes disposed in substantially uniformly spaced apart, side-by-side relation, each electrode being formed of an alloy comprised of iron, nickel, and cobalt, and each electrode having a substantially flat central portion, a substantially flat circumferential portion, and an axially offset portion located intermediate the central and circumferential portions, each electrode having a centrally located opening in the central portion thereof, the major portion of each electrode being disposed within the vacuum chamber, and the spacing between adjacent electrodes defining a vacuum gap, means electrically connecting the electrodes to a source of electrical power,

a plurality of similar annular support insulators, each being formed of a glass material having the same thermal expansion rate as the electrodes, each insulator having opposed front and rear surfaces and having an inner surface, each front and rear surface of each insulator having an annular groove therein, said grooves in each insulator being disposed in annular alignment, and

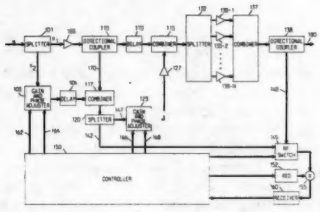
a plurality of annular metallic inserts, each being positioned and fused within the recess of an insulator, and each being formed of the same alloy as the electrodes, means metallically bonding the annular inserts of each insulator to the circumferential portions of a pair of adjacent electrodes to form a seal thereat.

4,879,519

PREDISTORTION COMPENSATED LINEAR AMPLIFIER

Robert E. Myer, Denville, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Labs, Murray Hill, N.J.

Filed Oct. 31, 1988, Ser. No. 265,187
Int. Cl.[4] H03F *1/32*
U.S. Cl. 330—149 **25 Claims**



1. A distortion compensation circuit for a power amplifier having a prescribed distortion characteristic comprising;

means for receiving one or more input signals including at least one carrier signal in a predetermined frequency range;

a first circuit path having an input connected to the receiving means and an output including a first amplifier with a predetermined gain and substantially the same prescribed distortion characteristic as the power amplifier responsive to the one or more input signals for generating an output signal including a component corresponding to the one or more input signals modified by said predetermined gain and a distortion component corresponding to the prescribed distortion characteristic;

a second circuit path having an input connected to the receiving means and an output for transferring the one or more input signals without distortion;

first means for combining the output of the first circuit path with the transferred one or more input signals from the output of the second circuit path to form a signal corresponding to the distortion component of the first circuit path output signal;

second means for combining the distortion component signal

from the first combining means with the output signal of the first circuit path to form a signal having a component corresponding to the one or more input signals modified by the predetermined gain and a component corresponding to the distortion characteristic of the first amplifier in inverted phase relationship thereto; and

means for controlling the signal formed in the first combining means including

means for detecting a carrier signal in the prescribed frequency range;

means connected to the output of the first combining means for monitoring the detected carrier signal at the output of the first combining means; and

means in the second circuit path responsive to the output of said monitoring means for adjusting the magnitude and phase of the signal applied to the second circuit path to minimize the monitored carrier signal.

4,879,520

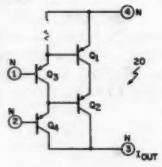
HIGH ACCURACY CURRENT SOURCE AND HIGH ACCURACY TRANSCONDUCTANCE STAGE

Gerald M. Cotreau, Melbourne, Fla., assignor to Harris Corporation, Melbourne, Fla.

Filed Oct. 27, 1988, Ser. No. 263,189

Int. Cl.[4] H03F 3/45

U.S. Cl. 330—257 **34 Claims**



3. A current source comprising:

a first and second transistor having their emitter-collector paths connected in series between a first reference terminal and an output terminal; and

correction means connected to bases of said first and second transistors and said output terminal for adding current to said output terminal as a function of base current of said first and second transistors, and for sensing incremented current through said second transistor and adding said sensed incremented current to said output terminal to cancel the effect of said second transistor on the impedance of said output terminal.

4,879,521

DIFFERENTIAL AMPLIFIER

Michael V. Bredemann, Rio Rancho, N. Mex., and Forest S. Seitz, Beaverton, Oreg., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 23, 1989, Ser. No. 299,909

Int. Cl.[4] H03F 3/45

U.S. Cl. 330—258 **10 Claims**

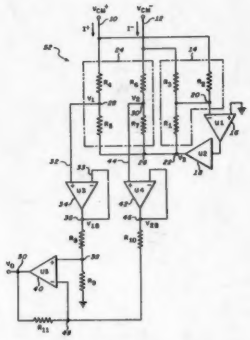
1. A differential amplifier for extracting a differential signal component in the presence of a substantially greater common mode signal, comprising:

first and second input terminals for receiving respective differential signal and common mode signal voltage components applied thereto,

a first summing network having first and second impedance elements respectively coupled to said first and second terminals and to a common junction for producing a signal representative of said common mode signal,

an amplifier having an input and an output, said input coupled to said first summing network for producing a signal proportional to and in a sense opposing said common mode signal,

a second summing network comprising a plurality of further impedance elements having first and second nodes coupled respectively to said first and second input terminals and a third node coupled to said output of said amplifier for combining said common mode signal and said opposing signal so as to produce a null value thereof and to transmit at least a portion of said differential signal to a pair of output terminals coupled respectively to points



intermediate of pairs of said plurality of impedance elements,

differential gain means having a pair of input terminals for receiving said portion of said differential signal and providing an amplified output thereof substantially independent of said common mode signal, and

impedance isolating means having an output coupled to said input terminals of said differential gain means and an input coupled to said intermediate points of said second summing network for isolating said second summing junction from an input impedance of said differential gain means.

4,879,522

INTEGRATED COMPLEMENTARY PUSH-PULL B FINAL STAGE

Johann Mattfeld, Obersulm, Fed. Rep. of Germany, assignor to Telefunken electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Aug. 12, 1988, Ser. No. 231,528

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1987, 3728078

Int. Cl.[4] H03F 3/26

U.S. Cl. 330—263 **4 Claims**

1. A complementary push-pull class B final stage having first and second complementary driver transistors and having third and fourth complementary driver transistors whose emitters are directly interconnected,

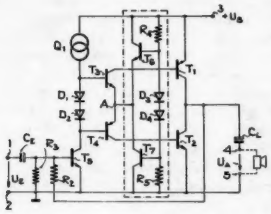
wherein an integratable circuit is disposed between the connected emitters of the third and fourth driver transistors and an operating voltage

the integratable circuit having dynamic low impedance such that about half of the operating voltage drops across the integratable circuit, and wherein the integratable circuit includes:

(a) fifth and sixth complementary transistors whose emitters are connected together and linked to the connected emitters of the third and fourth complementary transistors, and whose collectors are connected respectively to first and second terminals of the operating voltage source,

(b) a first resistor arranged between said first terminal of the operating voltage source and the base of the fifth transistor,

(c) a second resistor disposed between the second terminal of the operating voltage source and the base of the sixth transistor, and



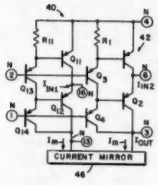
(d) two diodes connected in series and oriented in the conducting direction with regard to the operating voltage, for connecting the bases of the fifth and sixth complementary transistors.

4,879,523

HIGH ACCURACY, HIGH IMPEDANCE DIFFERENTIAL TO SINGLE-ENDED CURRENT CONVERTER

Gerald M. Cotreau, Melbourne, Fla., assignor to Harris Corporation, Melbourne, Fla.

Filed Nov. 18, 1988, Ser. No. 272,908
Int. Cl.[4] H03F *3/04*
U.S. Cl. 330—288 **20 Claims**



1. A differential current to single-ended current converter including first and second variable current sources having first and second current input terminals and first and second output terminals, respectively, and subtracting means for subtracting output current at said first output terminal from the current at said second output terminal, said second output terminal being said converter's output terminal;

wherein said second variable current source includes a first transistor having its emitter-collector path connected in series between a first reference terminal and said converter's output terminal, and includes a second transistor having its emitter-collector path connected between said subtracting means and said converter's output terminal; and

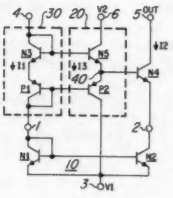
including correction means connected to bases of said first and second transistors and the emitter-collector path of said second transistor for sensing incremental current through said first and second transistors and providing said sensed incremental current to said emitter-collector path of said second transistor to cancel the effect of the incremental current through said first and second transistors on the impedance at said converter's output terminal.

4,879,524

CONSTANT CURRENT DRIVE CIRCUIT WITH REDUCED TRANSIENT RECOVERY TIME

Kenneth M. Bell, Windom, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 22, 1988, Ser. No. 234,987
Int. Cl.[4] H03F *3/26*
U.S. Cl. 330—288 **22 Claims**



1. A constant current drive circuit, comprising:

a current amplifier having a first terminal coupled via a threshold conduction device to a circuit input terminal and having a second terminal coupled via the conduction path of an output transistor to a circuit output terminal; and

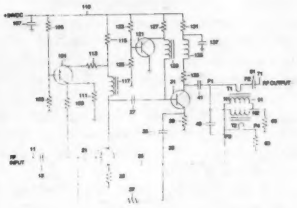
a bi-directional amplifier coupled to supply a voltage produced by said threshold conduction device to a control electrode of the output transistor for causing an output current to be supplied to said circuit output terminal proportional to an input current supplied to said input terminal, the bi-directional amplifier being biased for continuous conduction of operating current to provide a low impedance node at the control electrode of the output transistor, the bi-directional amplifier further being responsive to transients of either polarity at the control electrode for enhancing the recovery time of the drive circuit for abrupt changes in output voltage at said circuit output terminal.

4,879,525

HIGH GAIN RF AMPLIFIER WITH DIRECTIONAL COUPLER FEEDBACK

Stephen J. Larkin, Palm Bay, Fla., assignor to Q-Bit Corporation, Palm Bay, Fla.

Filed Dec. 5, 1988, Ser. No. 279,771
Int. Cl.[4] H03F *1/34, 3/191*
U.S. Cl. 330—294 **10 Claims**



1. A signal amplifier comprising:

a first amplifier stage having an input to which input signals to be amplified by said amplifier are coupled, and an output;

a second amplifier stage having an input coupled to the output of said first amplifier stage and an output;

a directional coupler coupled to the output of said second amplifier stage for deriving an amplified output signal

therefrom and being coupled to provide a feedback path between the output of said second amplifier stage and said first amplifier stage; and

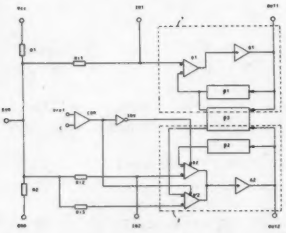
further feedback means for coupling said second amplifier stage to said first amplifier stage.

4,879,526

INTEGRATED AUDIO AMPLIFIER ELECTRONICALLY COMMUTABLE FROM A SINGLE ENDED OR STEREO CONFIGURATION TO A BALANCED OR BRIDGE CONFIGURATION AND VICEVERSA

Edoardo Botti, Mortara, and Aldo Torazzina, Monza, both of Italy, assignors to SGS-Thomson Microelectronics, s.r.l., Italy

Filed Sep. 19, 1988, Ser. No. 246,111
Claims priority, application Italy, Sep. 30, 1987, 83659 A/87
Int. Cl.[4] H03F *3/68*
U.S. Cl. 330—295 8 Claims



1. An integrated audio amplifier which is commutable from a stereo configuration to a bridge configuration and vice versa, in a package having at least seven pins of which: two output pins, two input pins, a power supply pin, a ground pin and an SVR pin for a common mode signals rejection function, comprising

a first and a second operational amplifier each being formed by an output gain stage whose output terminal is respectively connected to one of said two output pins of the integrated audio amplifier, and respectively, by at least a single and by at least two distinct, first and second input differential stages, the output terminals of which are respectively connected in common and to the input of the relative output gain stage;

two distinct feedback resistor networks for a stereo configuration connected, respectively, between the output terminal of an output gain stage and a respective inverting input terminal of at least said single and of at least the first of said two distinct input differential stages;

a third feedback resistor network for a bridge configuration connected between the output terminals of said two output gain stages and to an inverting input terminal of at least said single and of said second of said two distinct input differential stages;

a noninverting input of at least said single input differential stage and of said first of said two distinct input differential stages being connected, respectively, to one and to the other of said two input pins;

a noninverting input of said second of said two distinct input differential stages of said second operational amplifier being connected to a common potential node of the integrated audio amplifier;

a comparator having a transition threshold fixed by means of a constant reference voltage and having an input and an output terminal;

the output terminal of said comparator being connected to an on-off control terminal of at least said second of said two distinct input differential stages of said second operational amplifier and to an input terminal of an inverter stage having an output terminal which is connected to at least an on-off control terminal of at least said first of said two distinct input differential stages of said second operational amplifier;

the input terminal of said comparator being connected to a common potential node the voltage level of which is imposed by means external to the integrated audio amplifier;

said level of voltage imposed determining a state of the comparator and the switching on of one and the switching off of the other of said first and second distinct input differential stages of at least said second operational amplifier;

means for powering the integrated audio amplifier;

means for coupling an audio signal to be amplified to said input pins; and

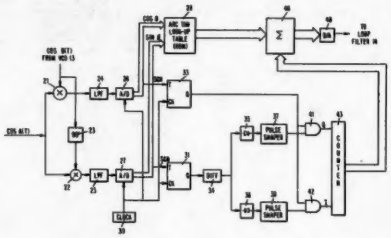
means capable of applying a DC voltage to said SVR pin having an intermediate value comprised between the voltage applied to said power supply pin and the voltage of said ground pin.

4,879,527

PHASE LOCK LOOP AND IMPROVED PHASE DETECTOR THEREFOR

Michael Geile, Loveland; Mark Dapper, Cincinnati, and Terrance Hill, Fairfield, all of Ohio, assignors to Cincinnati Electronics Corporation, Cincinnati, Ohio

Filed Jan. 23, 1989, Ser. No. 301,527
Int. Cl.[4] H03L *7/08;* H03K *5/26*
U.S. Cl. 331—1 A 31 Claims



1. Apparatus for deriving a signal having a magnitude indicative of the phase difference between first and second signals having similar but not necessarily the same frequencies comprising means responsive to the first and second signals for deriving third and fourth signals having amplitudes respectively representing the amplitudes of orthogonal components of the difference frequency of the first and second signals, and means responsive to the third and fourth signals for deriving fifth, sixth and seventh signals respectively indicative of (a) the cycle difference of the third and fourth signals, (b) the fractional cycle phase difference of the third and fourth signals, and (c) a combination of the amplitudes of fifth and sixth signals.

4,879,528

ULTRASONIC OSCILLATION CIRCUIT

Masakazu Gotanda, Sagamihara, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Aug. 30, 1988, Ser. No. 238,186
Int. Cl.[4] H03L *7/10, 7/12;* G05D *19/02*
U.S. Cl. 331—4 18 Claims

1. An ultrasonic oscillation circuit for generating a driving signal for driving an ultrasonic vibrating element comprising:

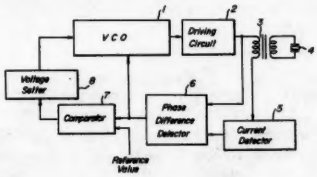
oscillating means having a control input for generating an oscillation signal having a frequency in accordance with a control signal supplied to said control input;

driving means for supplying said oscillation signal from the oscillating means to the ultrasonic vibrating element as a driving signal;

phase difference detecting means for detecting a phase difference between a voltage and a current of the driving signal supplied to the ultrasonic vibrating element;

means for supplying the control signal corresponding to said phase difference to said control input of said oscillating means;

comparing means for comparing said phase difference with a reference value to generate an output signal each time the phase difference exceeds the reference value; and



resetting means for responding to said output signal from the comparing means and supplying a control signal to said control input of said oscillating means, said resetting means comprising a semiconductor switch connected to said control input of said oscillating means, said output signal from said comparing means being supplied to a control input of said semiconductor switch to change said control signal to a level such that the frequency of the oscillation signal from the oscillating means is reset to a predetermined frequency.

4,879,529

PHASE CONTROL LOOP WITH INTERRUPTED CONTROL

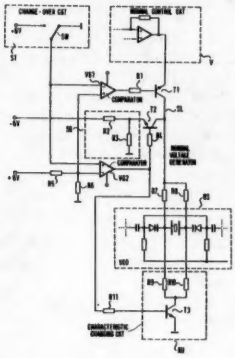
Volkmar Schroth, Nürnberg, and Horst Levin, Lauf, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 5, 1988, Ser. No. 253,785

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1987, 3735188

Int. Cl.[4] H03L *7/14, 1/02*

U.S. Cl. 331—14 **12 Claims**



1. A phase control loop comprising a voltage-controlled oscillator, a source of normal control voltage connected to control the voltage-controlled oscillator, and a control substitution circuit that interrupts control by said source and allows the voltage-controlled oscillator to operate with a nominal control voltage,

characterized in that said control substitution circuit comprises means for reducing the sensitivity of said voltage-controlled oscillator to changes in a control voltage applied to the osillator while control by said source is interrupted.

4,879,530

MONOLITHICALLY INTEGRATABLE PHASE SHIFTER VCO

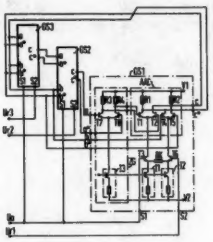
Wilhelm Wilhelm, and Winfried Birth, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 270,741

Claims priority, application Fed. Rep. of Germany, Nov. 19, 1987, 3739210

Int. Cl.[4] H03B *5/24, 27/00*

U.S. Cl. 331—45 **7 Claims**



1. Phase shifter oscillator assembly, comprising a phase shifter oscillator having a voltage-controllable output frequency and including at least first and last fundamental circuits,

each of said fundamental circuits including:

an amplifier adding circuit having a symmetrical first input, a symmetrical second input, and an output,

a control input connected to said control inputs of all of the other fundamental circuits for receiving a tuning potential for varying a ratio of an amplification operative between said symmetrical first input and said output of said amplifier adding circuit to an amplification operative between said symmetrical second input and said output of said amplifier adding circuit,

a reference input for receiving a respective reference potential,

a symmetrical first input of said fundamental circuit including a first input pair with a first non-inverting input and a first inverting input,

a symmetrical second input of said fundamental circuit forming said symmetrical second input of said amplifier adding circuit and including a second input pair with a second non-inverting input and a second inverting input,

a symmetrical signal output including an output pair with a non-inverting signal output and an inverting signal output, and

a symmetrical timing element having an input connected to said symmetrical first input of said fundamental circuit and having an output forming said symmetrical first input of said amplifier adding circuit;

said first input pair of each of said fundamental circuits being associated with said output pair of only one other of said fundamental circuits, said first non-inverting input of said first fundamental circuit being connected to said non-inverting signal output of one other of said fundamental circuits, and said first inverting input of said first funda-

mental circuit being connected to said inverting signal output of said same other fundamental circuit,

said non-inverting signal output of said first fundamental circuit being connected to said first inverting input of said last fundamental circuit and to said second inverting inputs of all of said fundamental circuits, and said inverting signal output of said first fundamental circuit being connected to said first non-inverting input of said last fundamental circuit and to said second non-inverting inputs of all of said fundamental circuits;

at least one of said signal outputs of at least one of said fundamental circuits forming a signal output of the phase shifter oscillator.

4,879,531

INDUCTIVE PROXIMITY SWITCH OSCILLATOR HAVING SAME ACTIVATING RANGE FOR FERROUS AND NONFERROUS METALS

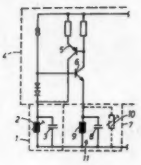
Burkhard Tigges, Sundern, and Dierk Brasse, Schalksmuehle, both of Fed. Rep. of Germany, assignors to Werner Turck GmbH & Co., KG, Halver, Fed. Rep. of Germany

Filed Apr. 29, 1988, Ser. No. 188,220

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1987, 3714433

Int. Cl.[4] H03K *17/95*; G01V *3/10*

U.S. Cl. 331—65 **8 Claims**



1. Inductive proximity switch comprising an oscillator circuit with a frequency resonant circuit determining a frequency of oscillation of the oscillator circuit and an impedance member determining an amplification factor of the oscillator circuit, the impedance member containing an impedance resonant circuit with a sensor coil responsive to the approach of a metallic trigger, wherein the oscillation condition of the oscillator circuit changes at a critical impedance value of the impedance member associated with a switching distance of the trigger, such that the resonant frequency of the frequency resonant circuit and the critical impedance value of the impedance member are tuned to the coordinates of a point of intersection of the impedance/frequency characteristics of the oscillator circuit, resulting in the same switching distance for a nonferrous trigger and for a ferrous trigger.

4,879,532

METHOD AND APPARATUS FOR PHASE CONJUGATE OPTICAL MODULATION

David M. Shemwell, Dallas, and Cyrus D. Cantrell, Richardson, both of Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

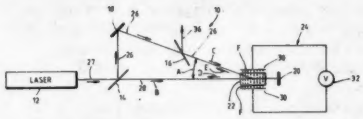
Filed May 3, 1984, Ser. No. 606,678

Int. Cl.[4] H01S *3/098, 3/23*

U.S. Cl. 330—4.3 **10 Claims**

1. A method of modulating a phase conjugate laser beam comprising the steps of:

creating a phase hologram within a nonlinear semiconductor medium by causing a plurality of laser beams to overlap along a substantially coincident beam path through said nonlinear semiconductor medium; and



dispersing the phase hologram by establishing an electric field directed substantially transversely to said beam path through said nonlinear semiconductor medium to modulate the intensity of the diffracted light.

4,879,533

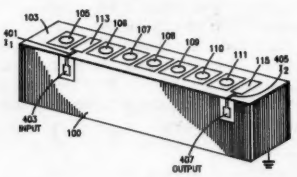
SURFACE MOUNT FILTER WITH INTEGRAL TRANSMISSION LINE CONNECTION

David M. de Muro; John G. Stillmank, both of Schaumburg, and Duane C. Rabe, Rolling Meadows, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 1, 1988, Ser. No. 176,541

Int. Cl.[4] H01P *1/202, 7/04*

U.S. Cl. 333—206 **45 Claims**



1. A surface mountable dielectric block filter which directly mounts on a conductive surface of a substrate, comprising:

a volume of dielectric material having at least two conductive resonators within said volume of dielectric material and extending from a first surface of said volume of dielectric material to a second surface of said volume of dielectric material, said second surface and at least part of a third surface of said volume of dielectric material being substantially covered with a conductive material;

a first electrode disposed on said first surface of said volume of dielectric material for coupling to a first one of said at least two resonators;

a first terminal disposed on said third surface of said volume of dielectric material for directly connecting to the conductive surface of the substrate; and

a first transmission line disposed on at least one surface of said volume of dielectric material, said first transmission line having first and second ends, coupled at said first end to said first electrode and coupled at said second end to said first terminal.

4,879,534

CONNECTING ELEMENT FOR WAVEGUIDES

Georg Spinner, Am Eichberg 12, 8152 Feldkirchen-Westerham, Fed. Rep. of Germany

Filed Aug. 11, 1988, Ser. No. 231,189

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727198

Int. Cl.[4] H01P *5/00*

U.S. Cl. 333—257 **8 Claims**

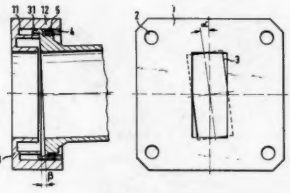
1. A connecting element for waveguides, comprising:

a first waveguide section;

a second waveguide section; and

choke means for electrically coupling said first and second

waveguides, said first and second waveguide sections being mechanically connectable via said choke means for permitting said waveguide sections to be displaced in an axial direction, to be tilted and to be rotated relative to each other, said choke means including a first section extending between facing connecting planes of said first and second waveguide sections and an axial section pro-



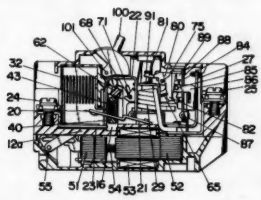
vided in one of said waveguide sections, said first waveguide section being provided at its periphery with an axial annular groove extending radially outside said axial section of said choke means, and said second waveguide section being provided with a circumferential collar projecting at least in an axial direction and engaging in said annular groove.

4,879,535

REMOTELY CONTROLLABLE CIRCUIT BREAKER

Tamotsu Mori, and Makoto Yasuda, both of Shijonawate, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed May 17, 1988, Ser. No. 195,054
Int. Cl.[4] H01H *75/00*
U.S. Cl. 335—14 **12 Claims**



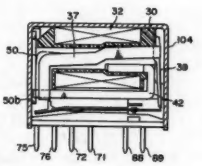
1. A remotely controllable circuit breaker comprising:
power contact means adapted to be connected in a power circuit for managing an electric load;
a collapsible mechanical linkage connected to close and open said power contact means;
an electromagnet having excitation coil means and an armature, said excitation coil means connected in a control circuit to be energized and deenergized upon receiving a remote control signal, said armature being movable in response to the energization and deenergization of said excitation coil means between an actuated position of driving said power contact means through said mechanical linkage into the closed condition and a rest position of driving said power contact means through said mechanical linkage into the open condition;
a control switch connected in said control circuit with said excitation coil;
a manual handle movable between an ON-position and OFF-position and connected to close said control switch when it is moved to the ON-position and open the same when it is moved to the OFF-position,
fault current sensing means for sensing a fault current passing through said main contact means;
tripper means cooperative with said fault current sensing means and operatively connected to said collapsible mechanical linkage for directly actuating the latter independently of said electromagnet to unlatch and release the same into a collapsed position of opening said power contact means from a latched position of keeping the power contact means closed in response to a fault current condition sensed by said fault current sensing means; and
said manual handle being mechanically isolated from said collapsible mechanical linkage as far as the latter is moved to open and close said power contact means while kept in said latched position.

4,879,536

ELECTROMAGNETIC RELAY

Jisei Taguchi; Yutaka Miura; Kenji Iwanaga, all of Atsugi, and Manabu Tada, Hiratsuka, all of Japan, assignors to Anritsu Corporation, Tokyo, Japan

Filed Sep. 28, 1988, Ser. No. 250,338
Claims priority, application Japan, Sep. 30, 1987, 62-246184; Sep. 30, 1987, 62-149379[U]
Int. Cl.[4] H01H *51/08*
U.S. Cl. 335—128 **6 Claims**



1. An electromagnetic relay comprising:
a cylindrical bobbin having a through hole;
a coil wound around an outer surface portion of said bobbin;
a yoke and an armature inserted in said through hole;
a hinge spring supporting a proximal end portion of said armature;
a drive card mounted on a distal end portion of said armature;
movable contact springs driven when said drive card abuts against said movable contact springs;
break and make contacts brought into contact with and moved away from said movable contact springs;
a step formed at a middle portion of the outer surface of said cylindrical bobbin, said bobbin having a large-diameter outer surface portion at one side of said step, and a smaller-diameter outer surface portion at the other side of said step;

4,879,537

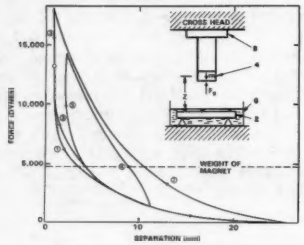
MAGNETIC SUSPENSION AND MAGNETIC FIELD CONCENTRATION USING SUPERCONDUCTORS

David B. Marshall; Roger E. De Wames; Peter E. D. Morgan, and Joseph J. Ratto, all of Thousand Oaks, Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Jul. 25, 1988, Ser. No. 223,591
Int. Cl.[4] H01F *7/22*
U.S. Cl. 335—216 **13 Claims**

1. A device for suspending a load comprising:
a support;
a superconductor supported by the support;
a magnetic field penetrating the superconductor;

a magnet suspended below the superconductor, the magnet providing a magnetic moment which is substantially



aligned parallel to and in the same direction as the magnetic field; and

a means for coupling the load to the magnet.

4,879,538

MAGNET SYSTEM FOR NUCLEAR MAGNETIC RESONANCE TOMOGRAPHY DEVICES

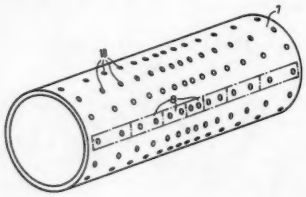
Guenther Pausch, Effeltrich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 1, 1988, Ser. No. 226,878

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727234

Int. Cl.[4] H01F *3/00*

U.S. Cl. 335—298 **6 Claims**



1. A magnet system for generating a homogeneous magnetic field in an examination volume of a nuclear magnetic resonance tomography apparatus, said magnet system comprising:

magnetic means for generating a magnetic field in said examination volume;

a surface surrounding said examination volume, said surface being permanently divided into a plurality of non-overlapping surface elements, each of said surface elements having an expanse increasing in a longitudinal direction of said surface from inside to outside, with successive ones of said surface elements disposed in contact with each other; and

a plurality of iron laminaee attached and matched in size to selected ones of said surface elements to homogenize said magnetic field.

4,879,539

LAMINATED COIL FOR AN EDDY-CURRENT TYPE STRONG AC MAGNETIC FIELD GENERATOR

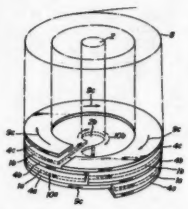
Kazuo Bessho, Kanazawa, Japan, assignor to Kanazawa University, Kanazawa, Japan

Filed Feb. 8, 1989, Ser. No. 307,524

Claims priority, application Japan, Mar. 7, 1988, 63-51704

Int. Cl.[4] H01F *5/00*

U.S. Cl. 335—299 **2 Claims**



1. A laminated coil for an eddy-current type strong AC magnetic field generator with a plurality of eddy-current carrying conductor disks, each disk having a central hole and a radial slit extending from the central hole, said coil comprising a plurality of annular conductor plates having radial slits respectively, and a plurality of insulation rings with radial slits respectively, each turn of the coil being formed of a coaxial lamination of one said annular conductor plate and at least one said insulation ring with the radial slits of the annular conductor plate and the insulation rings being aligned in one radial direction, adjacent turns of the coil being coaxially laminated one of the other so as to allow insertion of one said conductor disks therebetween in an insulated manner, the radial slits of the adjacent turns of the coil being displaced in circumferential direction in such a manner that a slitted end of the annular conductor plate of each turn is brought into contact with the annular conductor plate of an immediately neighboring turn through the radial slits of said each turn and the conductor disk.

4,879,540

DATA EXCHANGING SYSTEM USING A BAR CODE READER

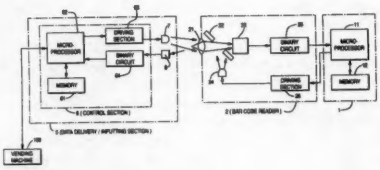
Kohei Ushikubo, Gunman, Japan, assignor to Sanden Corporation, Gunma, Japan

Continuation of Ser. No. 931,799, Nov. 18, 1986, abandoned. This application Nov. 14, 1988, Ser. No. 271,411

Claims priority, application Japan, Nov. 18, 1985, 60-257982

Int. Cl.[4] G06K *7/10*

U.S. Cl. 235—385 **7 Claims**



1. A vending machine comprising a data exchange system for exchanging administrative and operating data between the vending machine and an electrical device, the data exchange system being resident within the vending machine, each vending machine comprising:

data delivery means for converting administrative data of vending machine status in the form of width-modulated

electrical pulses to data in the form of width-modulated optical pulses which optical pulses resemble a bar code;

data receiving means for receiving operating data for vending machine operation in the form of width-modulated optical pulses transmitted from other machines and devices and converting the received data to width-modulated electrical pulses; and

control means for controlling the operation of said data delivery means and for decoding the width-modulated electrical signals received from said data receiving means, the control means comprising memory means for storing administrative information which is to be transmitted and for storing operating information which has been received.

4,879,541

SUPERVISORY CONTROL SYSTEM

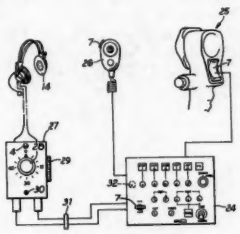
Marian Stefaniu, Willowdale, Canada; Paul Gran, Kfar Saba, Israel; Haim Feiner, deceased, late of Herzlia, and Ilana Feiner, heiress, Tel Aviv, both of Israel, assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 868,174, May 22, 1986, abandoned, which is a continuation of Ser. No. 478,825, Mar. 25, 1983, abandoned. This application Mar. 16, 1988, Ser. No. 168,719

Claims priority, application United Kingdom, Apr. 7, 1982, 8210326

Int. Cl.[4] H04Q *9/00*

U.S. Cl. 340—825.070 **15 Claims**



1. A method for dynamically altering the operational characteristics of a supervisory control system having at least one central station for communicating with a plurality of signal processing units each having a unit address and operational parameters stored therein, each of the plurality of signal processing units being operable to repeat a message from the central to another signal processing unit, comprising the steps of:

(a) receiving a message including at least a unit address and a command signal from the central station;

(b) modifying at least one parameter in response to said command signal;

(c) operating, thereafter, upon each received message to generate a second message addressed to another of the plurality of signal processing units, and optionally operating upon said received message to perform a function designated therein, until said modified parameter is restored.

4,879,542

ALARM SYSTEMS

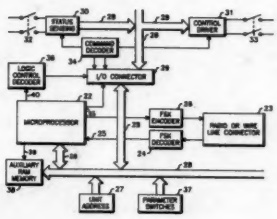
Adrian C. Elsey, The Middle House, Maidenhatch, Pangbourne, Reading RG8 8HJ, Berks, United Kingdom

Filed Aug. 24, 1988, Ser. No. 235,905

Int. Cl.[4] G08B *27/00, 1/00*

U.S. Cl. 340—326 **16 Claims**

1. An alarm system for an aircraft having a conventional radio/telecommunication (CR/T) system controlled by an radio telephony (R/T switch, said alarm system comprising first timer means operable, in use, to produce an electrical output signal on timing out, visual alarm means responsive to said output signal from said first timer means, second timer means responsive to said output signal from said first timer means to initiate its operation and operable to produce an electrical output signal on timing out for energising audio



alarm means, and rest means associated with said first timer means, whereby first a visual alarm is provided followed by an audio alarm unless said first timer means is rest prior to said second timer means timing out, said reset means comprising switch means actuated by actuation of said R/T switch.

4,879,543

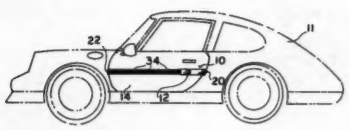
AUTOMOBILE DOOR GUARD

Leonard B. Smith, Sr., 4662 Conwell Dr., Annandale, Va. 22003

Filed Jun. 3, 1988, Ser. No. 201,783

Int. Cl.[4] B60Q *1/00*

U.S. Cl. 340—473 **9 Claims**



1. A protective device for removable attachment alternatively to the free end or between the free end and the hinged end of the exterior of an automobile door comprising:

A plurality of longitudinally displaceable protective strips including at least a primary protective strip member and a terminal protective strip member;

a cushioned housing member including at least a front portion and a rear portion, said terminal protective strip member rigidly affixed within said cushioned housing member, said cushioned housing member providing encasing means for said plurality of protective strips,

door gripping means pivotably attached to said primary protective strip and said rear portion of said housing for engaging said door either by both door gripping means attached to the free end, or the gripping means attached to opposite edges of said door, channel means disposed throughout said plurality of protective strips and including yieldable retention means, spanning said protective strips,

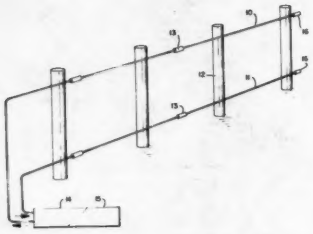
whereby upon longitudinally extending said plurality of protective strips, said protective device is attachable to said door, thus providing protection thereto.

4,879,544

INTRUSION DETECTION SYSTEM

Melvin C. Maki, and Walter J. Feller, both of Kanata, Canada, assignors to Control Data Canada Limited, Ottawa, Canada

Filed Nov. 4, 1987, Ser. No. 116,585
Claims priority, application Canada, Nov. 6, 1986, 522371
Int. Cl.[4] G08B *13/18*
U.S. Cl. 340—552 **22 Claims**



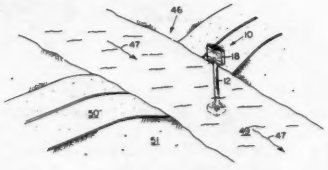
1. An intrusion detection system comprising:
- a transceiver including a source of r.f. energy, a receiver and signal processing means for extracting information from any received r.f. signal;
- at least one coaxial cable coupled to said transceiver to conduct r.f. energy from the source and transfer r.f. energy to the receiver; and
- at least one coupled wave device positioned on the cable and adapted to locally transfer r.f. energy between a transmission mode within the cable and a guided mode along the exterior of the cable.

4,879,545

SAFETY INDICATOR DEVICE FOR LOW WATER CROSSING

Alberto B. Aguilar, P.O. Box 1413, Uvalde, Tex. 78802

Filed Mar. 14, 1988, Ser. No. 167,865
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—624 **5 Claims**



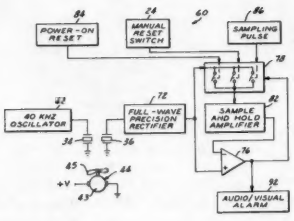
1. A signaling device for signaling when characteristics of water over a low-water crossing are excessively dangerous, comprising:
- an elongate support pipe positioned approximately vertically;
- an electrical circuit including a battery;
- triggering means rigidly connected to said elongate support pipe and electrically connected in said electrical circuit for closing said electrical circuit;
- a means for conveying a signal comprising a sign and a blinking light element, said sign being mounted to said elongate support pipe and being provided with a warning message, said blinking light element being electrically connected in said electrical circuit;
- an elongate member positioned within said elongate support pipe in slidable relation therewith an operatively connected at a first end to said triggering means for actuating said triggering means, said elongate member being provided with a stop rigidly connected thereto;
- a first means for actuating said triggering means when water rises within said elongate support pipe to a predetermined height, said first actuating means comprising a float slidably received within said support pipe and rigidly mounted to a second end of said elongate member;
- apertures received through the wall of said elongate support pipe at predetermined locations thereon, for enabling water to rise within said elongate support pipe to an elevation which represents the danger of water surrounding said elongate support pipe, said apertures being adapted for prohibiting the obstruction thereof by debris;
- a second means for actuating said triggering means when water rises to a predetermined height within the support pipe, said second actuating means comprising a float having a hole therethrough, said elongate member being received through the hole of said second actuating means;
- a straining means mounted to said elongate support pipe for straining particulate matter from water flowing through said apertures; and
- a drain hole for permitting water to exit from within said elongate support pipe.

4,879,546

ULTRASONIC HAND-HELD REFRIGERANT LEAK DETECTOR

Byron J. Dunham, Sherwood; Gary P. Murray, Montpelier, and Don A. Bulla, Bryan, all of Ohio, assignors to Kent-Moore Corporation, Warren, Mich.

Continuation of Ser. No. 126,936, Nov. 30, 1987, abandoned. This application Apr. 26, 1989, Ser. No. 344,422
Int. Cl.[4] G08B *17/10*
U.S. Cl. 340—632 **22 Claims**



1. Apparatus for detecting presence of contaminants in air comprising: sensor means including a spaced pair of radiant energy transducers, means for admitting a test air sample between said transducers, means for continuously applying a periodic signal to one of said transducers to launch radiant energy toward the other of said transducers, means including rectifier means coupled to said other of said transducers for providing an electrical measurement signal as a continuing d.c. output signal that is a function of velocity of radiant energy between said transducers, means for selectively sampling and electrically storing said measurement signal, means for deriving a reference signal from said sampled and stored measurement signal, means for continuously comparing said measurement signal to said reference signal, alarm means coupled to said continuous comparing means for indicating an alarm condition when a difference between said reference and measurement signals exceeds a preselected threshold indicating an increase in contaminants between said transducers, and means coupled to said continuously comparing means and to said alarm means and responsive to a change in said measurement signal indicating a decrease in contaminants following an indication of alarm condition at said alarm means for automatically resampling and storing said measurement signal as a new refer-

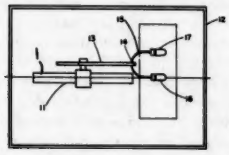
ence signal and thereby automatically terminating said indication of alarm condition at said alarm means.

4,879,547

GAS ZONE VALVE EMERGENCY ALARM SYSTEM

August J. Pryslak, Denver, Colo., assignor to Valve Alert Systems, Inc., Englewood, Colo.

Filed Sep. 29, 1988, Ser. No. 251,126
Int. Cl.[4] G08B *21/00*; F16K *37/00*
U.S. Cl. 340—686 13 Claims



6. A gas valve system, comprising:

valve means including movable handle means, said handle means of said valve means being adapted to cut off gas flow in a predetermined situation;

fiber optic bundle means for transmitting light and having a portion for engaging said handle means wherein, when said handle means is moved, said fiber optic bundle portion is moved; and

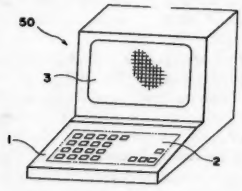
light detecting means responsive to said fiber optic bundle means for indicating whether said handle means of said valve means has been moved whereby gas flow is affected by said handle means movement.

4,879,548

FLAT KEYBOARD ARRANGEMENT

Akira Mitarai, Yamatokoriyama, and Hachizou Yamamoto, Soraku, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 2, 1988, Ser. No. 151,618
Claims priority, application Japan, Feb. 2, 1987, 62-23081; Feb. 4, 1987, 62-23966; Feb. 4, 1987, 62-23967; Feb. 10, 1987, 62-28981; Feb. 10, 1987, 62-28982
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—712 5 Claims



1. A flat keyboard arrangement comprising:

a color liquid crystal display means having a screen divided into a number of blocks, said blocks corresponding to an equal number of key units and capable of producing any natural color;

table means for storing color data for each of said blocks, and for storing function data representing a function assigned to each of said blocks, wherein said table means stores both a color and a function for each of said blocks;

means for driving said color liquid crystal display means to display said blocks in colors in accordance with the color data stored in said table means; and

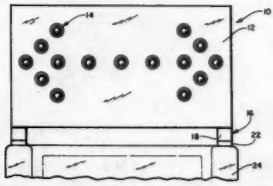
a transparent touch switch arrangement placed on said color liquid crystal display means, said transparent touch switch arangement having a transparent sheet in which a number of transparent touch switches comprising said key units are located correspondingly to said blocks of the screen to define touch keys.

4,879,549

SHROUD ATTACHMENT

George W. Eby, 29188 S. Grayshill Rd., Colton, Oreg. 97017

Filed Dec. 19, 1984, Ser. No. 683,695
Int. Cl.[4] G08G *3/00*
U.S. Cl. 340—815.2 10 Claims



1. In combination with a warning device including a panel having a front face and at least one orifice of predetermined size extending through the panel; a lamp having a back portion received within the orifice, said lamp further having an annular portion bounded by opposite sides and one side of the annular portion lying against said face of the panel in a region of the panel face extending about the periphery of the orifice; a shroud attachment comprising:

a tubular shroud having one end abutting the other side of the annular portion of the lamp with said region of the face of the panel and one end of the shroud retaining the lamp on the panel; and

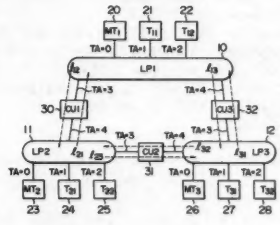
shroud carrier means mounting said shroud on the panel, said carrier means including a collar portion fitted about the periphery of said one end of said shroud and a flange portion extending about said collar portion, substantially normal to the axis of the collar portion, attaching said carrier means to the panel.

4,879,550

METHOD AND SYSTEM FOR LOOP COMMUNICATION

Yusuke Hino; Tohru Horimoto; Hideaki Gemma; Toshiharu Iwata, and Kimitoshi Yamada, all of Hadano, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 9, 1986, Ser. No. 871,995
Claims priority, application Japan, Jun. 19, 1985, 60-133289
Int. Cl.[4] H04Q *3/00*; H04J *3/00*
U.S. Cl. 340—825.050 9 Claims



1. A loop communication system, comprising a plurality of loop communication paths interconnected through loop coupling devices, each loop communication path having a first

message terminal for sending a first message frame including routing information and at least one second terminal for sending and receiving a second message frame on said loop communication paths; and each of said loop coupling devices including means responsive to said first message frame received from a loop communication path for storing routing information carried by said first message frame for controlling the transfer of second message frames between the loop communication paths connected thereto, means for receiving a second message frame from a loop communication path, and means for selectively sending a received second message frame from one loop communication path to another or back to said one loop communication path on the basis of said stored routing information.

4,879,551

SWITCHING ARRAY WITH CONCURRENT MARKING CAPABILITY

Christos J. Georgiou, White Plains; Yeong-Chang L. Lien, Briarcliff Manor, and Kiyoshi Maruyama, Chappaqua, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 26, 1985, Ser. No. 727,468

Int. Cl.[4] H04Q *1/00*

U.S. Cl. 340—825.870 **7 Claims**

1. A cross-point switching array system, comprising:

an array of cross-points for selectively connecting each of a plurality of first lines to any of a plurality of second lines;

an array of controlling means, each controlling means controlling a connection across one of said crosspoints, each said controlling means comprising:

first memory means for storing a present connection value, the output of said first memory means presently determining said connection; and

second memory means associated with said first memory means, for storing a future connection value; and

said system further comprising:

means for concurrently transferring said future connection value from each said second memory means to the associated first memory means wherein said transferred future connection value becomes said present connection value.

4,879,552

VARIABLE CAPACITANCE TYPE ENCODER

Yoshihiro Arai, Tokyo; Kouji Sasaki, and Takanori Ohsaki, both of Kanagawa, all of Japan, assignors to Mitutoyo Mfg. Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 866,787, May 23, 1986, abandoned. This application Apr. 20, 1988, Ser. No. 185,348

Claims priority, application Japan, May 23, 1985, 60-111826; May 23, 1985, 60-111827; May 27, 1985, 60-114474

Int. Cl.[4] G01D *5/243*; G01B *7/30*

U.S. Cl. 340—870.37 **5 Claims**

1. A variable capacitance type encoder comprising:

a rotary disc which is rotatably mounted on a frame body and rotates in accordance with the amount of movement of a probe; and

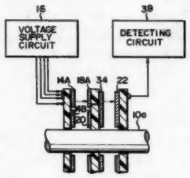
first and second fixed plates which are secured to said frame body such as to be opposed to each other with said rotary disc therebetween;

wherein at least one of said first and second fixed plates is provided with a first transmitting electrode composed of a plurality of consecutive electrode elements to which alternating voltages of different phases are applied and which are annularly arranged at regular intervals in the circumferential direction of said at least one of said fixed plates;

at least one of said first and second fixed plates is provided with a second transmitting electrode which is composed of a plurality of consecutive electrode elements aligned in the radial direction, with respect to the center of said at least one fixed plate, with a corresponding electrode of said first transmitting electrode and to each of said second transmitting electrode is applied an alternating voltage 180° out-of-phase with respect to that applied to its corresponding electrode element of said first transmitting electrode and which are annularly arranged at regular intervals in the circumferential direction of said at least one of said fixed plates;

wherein said rotary disc is provided with first and second receiving electrodes which are opposed to a plurality of said consecutive first and second transmitting electrodes, respectively, and which receive signals of a common phase by electrostatic coupling, said first and second receiving electrodes being disposed at positions which are spaced from each other at a predetermined phase interval in terms of mechanical angle with respect to the center of rotation;

wherein an output electrode is provided on a surface of at least one of said fixed plates for fetching the receiving signals from said first and second receiving electrodes, whereby the rotary displacement of the rotary disc is detected on the basis of the output signal of said output electrode which varies in accordance with the rotation of said rotary disc;



wherein said first fixed plate is provided with said first transmitting electrode composed of said plurality of electrode elements to which alternating voltages of different phases are applied and which are annularly arranged at regular intervals in the circumferential direction of said first fixed plate, and said second transmitting electrode composed of said plurality of electrode elements to each of which an alternating voltage 180° out of phase with respect to that applied to each electrode element of said first transmitting electrode and which are annularly arranged on the inside of said first transmitting electrode at regular intervals in the circumferential direction of said first fixed plate; and

wherein the electrode elements of the first and second transmitting electrodes and the first and second receiving electrodes each form concentric rings with one on the outer peripheral side of a surface of said first fixed plate and other on the inner peripheral side of said surface;

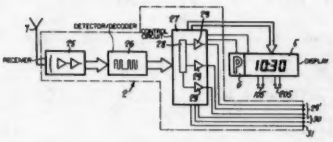
whereby displacement of the rotary disk is detected precisely without being effected by eccentricity, whirling or offset which may exist among the fixed plates and rotary disk.

4,879,553

ELECTRONIC PARKING TIME INDICATOR FOR AUTOVEHICLES

Nardino Righi, Via Manigo 2, Milano, Italy, assignor to Dante Siano and Nardino Righi, Italy

Filed Jul. 12, 1988, Ser. No. 217,828
Int. Cl.[4] B60Q *1/48*; G08B *1/00*
U.S. Cl. 340—932.2 **15 Claims**



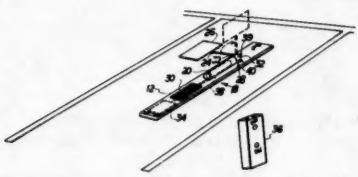
1. An electronic device for indicating the parking time of motor-vehicles, particularly for parking in the areas requiring a parking-time disc-indicator, or the like, said electronic device comprising a remote-control unit including a receiver arranged within the motor-vehicle and provided with an electronic digital clock having an associated display which is clearly visible from the outside, and with a small-sized transmitter, said transmitter including an electronic digital minute-counter having a respective display, and the transmitter further including a control member for, when actuated, causing the indication of the time on the electronic digital clock of the receiver to be made visible and to be simultaneously locked on the display of the electronic digital clock of the receiver, and causing, at the same time, starting of the electronic digital minute-counter of the transmitter.

4,879,554

BARRIER ASSEMBLY FOR A PARKING SPACE

Jorge Diaz-Silveira, 9817 NW. 4th Ter., Miami, Fla. 33172

Filed Mar. 11, 1988, Ser. No. 167,667
Int. Cl.[4] G08G *1/14*
U.S. Cl. 340—932.2 **14 Claims**



1. A barrier assembly designed to guard a parking space for an automobile and prevent entry therein of an unauthorized vehicle, said barrier assembly comprising:

(a) a base secured within the parking space substantially at ground level and dimensioned to include a height sufficient to allow passage of an automobile thereover,

(b) barrier means movably mounted on said base and selectively positionable between a blocking position and a retracted position for selectively blocking or allowing access to the parking space,

(c) drive means mounted on said base and connected to said barrier means for positioning thereof between said blocking position and said retracted position,

(d) power supply means connected to said drive means for providing activating power thereto,

(e) control means connected to said drive means and structured for activation thereof and selected disposition of said barrier means between said blocking position and said retracted position,

(f) said barrier means comprising two support portions each having an elongated configuration and each being interconnected to said drive means by a different connecting shaft, each of said connecting shafts extending outwardly from said drive means in substantially opposite directions from one another and rotatably driven by said drive means between said blocking position and said retracted position, and

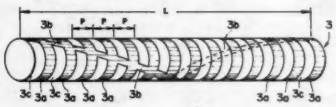
(g) said support portions being dimensioned to allow passage thereover of a vehicle into the parking space when the barrier means is disposed in said retracted position.

4,879,555

ABSOLUTE LINEAR POSITION DETECTION DEVICE

Wataru Ichikawa, Tokyo, and Yuji Matsuki, Sayama, both of Japan, assignors to Kabushiki Kaisha SG, Tokyo, Japan

Filed Aug. 4, 1986, Ser. No. 893,254
Claims priority, application Japan, Aug. 9, 1985, 60-175145
Int. Cl.[4] H03M *1/22*
U.S. Cl. 341—13 **18 Claims**



1. Absolute position detection device comprising:

a member having a first pattern which repeats change in the longitudinal direction of the member with a predetermined pitch and a second pattern which changes in the longitudinal direction of the member with a pitch which is different at least from that of the first pattern, these patterns being formed of a predetermined material and disposed on the member; and

a detection head section provided in proximity to this member and responding individually to the first pattern and the second pattern on said member, said detection head section changing its relation of correspondence to the respective patterns in accordance with its linear position with respect to said member and producing output signals in accordance with the relation of correspondence to the respective patterns;

wherein said second pattern consists of a pattern which is of a different form from said first pattern; and

wherein said first and second patterns are disposed in a mixed state in a common region on said member.

4,879,556

JOYSTICK CONTROL UNIT USING MULTIPLE SUBSTRATES

Johannes J. Duimel, Klimmen, Netherlands, assignor to Huka Developments B.V., Oldenzaal, Netherlands

Filed Oct. 26, 1987, Ser. No. 113,245
Claims priority, application Netherlands, Oct. 27, 1986, 8602697
Int. Cl.[4] G05G *9/04*; H01H *35/02*
U.S. Cl. 341—20 **29 Claims**

1. A joystick control comprising, in combination

controller means subjected to spring forces biasing said means towards a neutral position,

a transmitting coil made of electrically conducting paths on a substrate,

a plurality of receiving coils made by electrically conducting paths on a substrate and positioned at predetermined

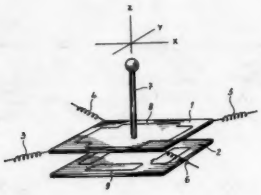
three-dimensional locations in relation to the transmitting coil,

characterized in that

the receiving coils are on a first substrate,

the transmitting coils is on a second substrate,

one of the substrates is connected to the controller means and is together therewith movable in relation to the other substrate, which is located at a substantially fixed position, and



the spring forces acting on the controller means also acting on the substrate connected to said controller means such that the controller means has at least two degrees of freedom,

whereby the transmitting coil and receiving coils being embodied such that unique combinations of output signals can be generated which are characteristic of each of the degrees of freedom of the controller means.

4,879,557

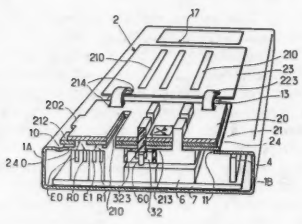
GENERAL PURPOSE KEYBOARD FOR CENTRAL PROCESSING UNIT WITH MICROPROCESSOR AND USE OF THIS KEYBOARD WITH A MICROCOMPUTER

Patrick Roche, Fontenay Le Fleury, France, assignor to La Souterraine S.A., Marseille, France

Filed Nov. 6, 1987, Ser. No. 118,490

Int. Cl.[4] G06F *3/02*

U.S. Cl. 341—23 **11 Claims**



1. A multi-purpose keyboard assembly for a central processing unit with a microprocessor **(9)** comprising: a housing having at least one set **(300)** of variable allocation keys, a booklet **(2)** removably fixed on the housing, said booklet comprising at least two pages **(30)**, **(21)** indicating the allocation of the keys; a first remote means of detection comprising light emitting cells (E0,E1) and photoelectric receivers (R0,R1) mounted on the housing for detecting the position of the pages **(20)**, **(21)** of the booklet **(2)**; a means for providing codes to the central processing unit **(9)** in response to the detection of the position of the pages **(20)**, **(21)** of the booklet **(2)** and in response to the actuation of a key **(32)** of the keyboard belonging to the one set **(300)** of keys, said means for providing codes comprising a scanning keyboard interface **(45)**, **(46)**, a keyboard processing unit **(40)** a data bus **(401)** and a programmable read only memory **(431)**; said scanning keyboard interface **(45)** being connected through the data bus **(401)** to the processing unit **(40)**; the programmable read only memory **(43)** containing tables (T1,T4) corresponding to the keys and the codes to be provided to the central processing unit **(9)** according to the position of the pages **(20)**, **(21)** of the booklet detected by the first remote means.

4,879,558

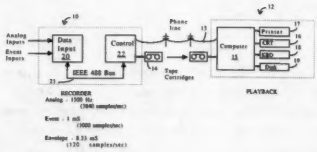
DATA COMPRESSION APPARATUS AND METHOD FOR DATA RECORDER WITH WAVEFORM ENVELOPE DISPLAY

Scott C. Swanson, Roswell, Ga., assignor to Sangamo Weston, Inc., Norcross, Ga.

Continuation-in-part of Ser. No. 940,999, Dec. 12, 1986. This application Jan. 22, 1987, Ser. No. 5,962

Int. Cl.[4] H03M *7/00*

U.S. Cl. 341—51 **45 Claims**



1. An electrical power line waveform envelope monitoring and display apparatus, comprising:

means connectable to an electrical power line for sampling signals representative of the peaks of waveforms occurring on said electrical power line and for providing a plurality of digital samples;

means for compressing said plurality of digital samples and for providing a compressed data set for transmission over a communication link;

means for transmitting said compressed data set over said communication link;

means for decompressing said compressed data set after transmission over said communication link and for providing a plurality of decompressed digital samples; and

means for displaying an envelope waveform reconstructed from said decompressed digital samples corresponding to the envelope of signals occurring on said electrical power line.

4,879,559

AZIMUTH PROCESSOR FOR SAR SYSTEM HAVING PLURALITY OF INTERCONNECTED PROCESSING MODULES

Bernard Arambepola, Colchester, United Kingdom, assignor to The General Electric Company p.l.c., London, United Kingdom

Filed Aug. 17, 1988, Ser. No. 233,251

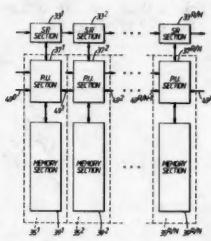
Claims priority, application United Kingdom, Aug. 17, 1987, 8719395

Int. Cl.[4] G01S *13/90, 7/44*

U.S. Cl. 342—25 **12 Claims**

1. An azimuth processor for a synthetic aperture radar system, which comprises a plurality of data processing modules, each associated with a different set of range line samples of the radar echo signals, each module including a memory to store the sets of samples from M successive range lines and data processing means for processing the samples contained in the memory for producing azimuth processed range line samples,

and adjacent modules being interconnected so that samples required for processing by a module and not contained in its



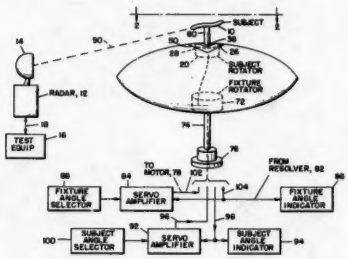
memory due to the range migration effect may be obtained from another module.

4,879,560

RADAR TEST DEVICE WITH ROTATOR INSIDE SUBJECT-SUPPORT FIXTURE

Mark A. McHenry, Stanford, Calif., assignor to Northrop Corporation, Hawthorne, Calif.

Filed Jul. 6, 1988, Ser. No. 215,675
Int. Cl.[4] G01S 7/40
U.S. Cl. 342—165 **5 Claims**



1. A radar test assembly of low radiation cross section for rotatably supporting a test subject to be illuminated by a radar signal from the antenna of a radar set comprising:

a fixture,

first rotator means for rotating the fixture,

a platform for supporting the test subject,

means for mounting said platform on said fixture,

second rotator means for rotating the platform relative to the fixture,

said fixture including a shield extending outwardly from an edge of the platform to form an envelope enclosing said first rotator and the platform and including an opening therein for receiving a test subject to be attached to the platform, the shield having electrically conducting surfaces inclined relative to a direction of propagation of radiation from the antenna for directing reflections of radiation emanating from the fixture away from the antenna, the fixture extending in curved fashion to form a body enclosing the rotator and the platform; and

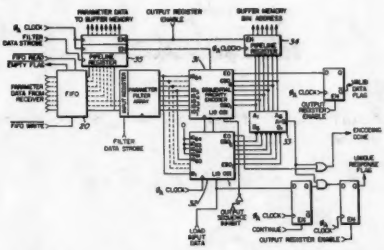
a radiation seal extending from the edge of the opening in the fixture to interface between a surface of the fixture and the platform.

4,879,561

FILTER SYSTEM FOR RADAR APPLICATIONS

Robert J. Inkol, Orleans, Canada, assignor to Her Majesty the Queen in Right of Canada, Canada

Filed Sep. 1, 1988, Ser. No. 239,312
Claims priority, application Canada, Feb. 4, 1988, 558103
Int. Cl.[4] G01S 7/44
U.S. Cl. 342—195 **15 Claims**



1. A filter system for filtering interleaved pulse descriptor words in received radar signals, the filter system comprising:

(a) a filter array unit for comparing parameters contained in each pulse descriptor word with sets of parameter ranges, the comparison of each parameter with each set of parameter ranges being made simultaneously, the filter array unit having a separate indicator output for each set of parameter ranges, the indicator output associated with a particular set of parameter ranges being activated whenever the compared parameters of the pulse descriptor word match the particular set of parameter ranges;

(b) a first sequential priority encoder unit having an hierarchical order to its inputs and producing an ordered sequence of encoded binary outputs uniquely corresponding to the inputs which are active at that time, the indicator outputs of the filter array unit being connected to the inputs of the first encoder unit; and,

(c) a first memory unit divided into a series of memory areas equal in number to the number of indicator outputs of the filter array unit, each of the memory areas being addressed by a respective different one of the possible binary outputs of the first encoder unit; whereby each pulse descriptor word is placed into that memory area which corresponds with the priority encoding of the indicator outputs that are activated when that pulse descriptor word is compared with the sets of parameter ranges in the filter array unit.

4,879,562

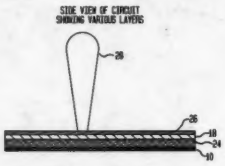
SLOTTED MICROSTRIP ANTENNA WITH FERRITE COATING

Richard A. Stern, Allenwood, and Richard W. Babbitt, Fair Haven, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 9, 1989, Ser. No. 295,613
Int. Cl.[4] H01Q 1/38, 3/44
U.S. Cl. 343—700 MS **9 Claims**

1. In a microstrip antenna including a bottom microstrip circuit including an array of microstrip lines of a conductive metal, a dielectric layer in contact with and overlying said microstrip circuit, and a metal ground plane in contact with and overlying said dielectric layer wherein said ground plane includes a metallic surface with rows of radiating slots etched through the metallic surface such that each row of slots over-

lies a particular microstrip line in said bottom microstrip circuit, the improvement of applying a thin coating of ferrite



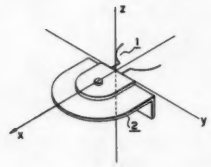
material to the surface of the metal ground plane not in contact with the dielectric layer.

4,879,563

CIRCULARLY POLARIZED COMPLEMENTARY ANTENNA WITH PATCH AND DIPOLE ELEMENTS

Shigeki Takeda, and Akihiro Takahashi, both of Tokyo, Japan, assignors to Kyocera Corporation, Kyoto, Japan

Filed Oct. 26, 1988, Ser. No. 262,607
Claims priority, application Japan, Oct. 30, 1987, 62-275071; Oct. 30, 1987, 62-275072
Int. Cl.[4] H01Q *21/00*
U.S. Cl. 343—725 **4 Claims**



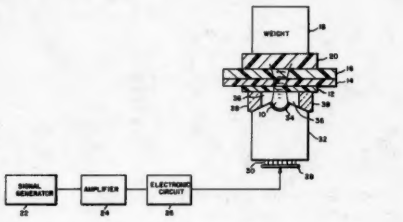
1. An antenna comprising:
a half-wavelength dipole antenna in the form of a semicircular ring at a specified frequency;
an E_{110}-mode patch antenna having a semicircular substantially planar configuration at said frequency;
means for coupling received power from said dipole antenna and said patch antenna in 90° phase difference to produce circular polarization reception characteristics; and
said dipole antenna and said patch antenna being adjacently disposed so the distance between them is relatively short compared to a wavelength at said frequency so as to minimize deviation of circular polarization characteristics.

4,879,564

ULTRASONIC DYE IMAGE FUSING

Michael E. Long, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 2, 1989, Ser. No. 305,263
Int. Cl.[4] G01D *15/00*
U.S. Cl. 346—25 **4 Claims**



1. In a thermal printing system in which a dye image is formed in a receiver, the improvement comprising:
ultrasonic transmission means for focussing ultrasonic energy at a position in or near the receiver to heat the receiver to fuse the dye image into the receiver.

4,879,565

INK JET PRINTER

Katsuyuki Fujii, Azuchi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jan. 27, 1989, Ser. No. 303,760
Claims priority, application Japan, Jan. 27, 1988, 63-14590
Int. Cl.[4] G01D *18/00*
U.S. Cl. 346—75 **14 Claims**

7. In an ink jet printer that can electrically charge ink droplets and project them through an electric field towards a target surface during a normal printing operation with the capacity of deflecting the charged ink droplets relative to the path of uncharged ink droplets for capturing the charged ink droplets before the target surface, the improvement comprising:
alignment means for adjusting the path of the charged ink droplets relative to the uncharged ink particles including means for varying the relative interaction of the charged ink droplets and the electric field to a lesser degree during an alignment procedure than during a printing operation.

4,879,566

THERMAL RECORDING APPARATUS

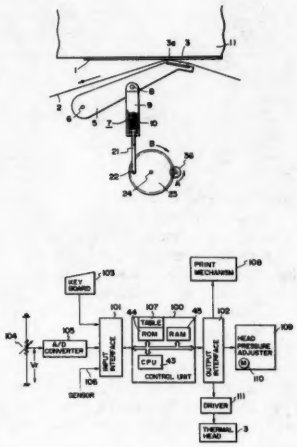
Tadashi Hanabusa, Zushi, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 11, 1988, Ser. No. 141,772

Claims priority, application Japan, Jan. 13, 1987, 62-5810; Dec. 16, 1987, 62-316007

Int. Cl.[4] G01D *15/10;* **B41J** *11/20, 3/20*

U.S. Cl. 346—76 PH **17 Claims**



1. A thermal recording apparatus for image recording on a recording medium, comprising:

a thermal head for image recording on said recording medium;

discrimination means for discriminating the species of said recording medium; and

pressure varying means for varying the force for maintaining the pressing condition by said thermal head on said recording medium according to the species thereof discriminated by said discrimination means.

4,879,567

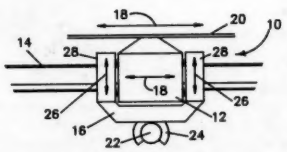
CARRIAGE COUPLING DEVICE SYSTEM FOR PEN PLOTTER

James Lawrence, Irvine, Calif., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Aug. 19, 1987, Ser. No. 86,846

Int. Cl.[4] G01D *15/16;* **F16C** *21/00*

U.S. Cl. 346—139 R **9 Claims**



1. In a carriage coupling drive system for a pen plotter including a moving carriage slidably mounted on a shaft between the ends of and carrying a U-shaped pen-carrying yoke in combination therewith for longitudinal sliding motion along the shaft and rotary motion about the shaft, the improved low-friction, low-play bearing system for supporting and separating the carriage and yoke with minimum longitudinal play between them during longitudinal movement and stopping comprising:

(a) a pair of annular ball-bearing thrust bearings disposed over the shaft between respective ends of the yoke and the carriage; and

(b) annular bias spring means disposed over the shaft for creating a longitudinal expansion force between the carriage and yoke on one end of the carriage resisting longitudinal play between the carriage and the yoke.

4,879,568

DROPLET DEPOSITION APPARATUS

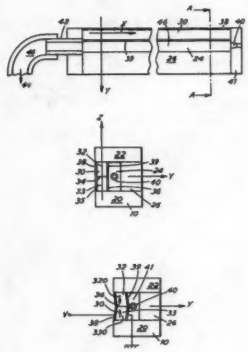
W. Scott Bartky, Chicago, Ill.; Anthony D. Paton; Stephen Temple, both of Cambridge, United Kingdom, and A. John Michaelis, Glen Ellyn, Ill., assignors to AM International, Inc., Chicago, Ill.

Filed Jan. 4, 1988, Ser. No. 140,764

Claims priority, application United Kingdom, Jan. 10, 1987, 8700531; Jan. 10, 1987, 8700533

Int. Cl.[4] G01D *15/16;* **B41J** *3/04*

U.S. Cl. 346—140 R **35 Claims**



1. A pulsed droplet deposition apparatus comprising a liquid droplet ejection nozzle, a pressure chamber with which said nozzle communicates and from which said nozzle is supplied with liquid for droplet ejection, a shear mode actuator comprising peizo-electric material and electrode means for applying an electric field thereto, and liquid supply means for replenishing in said chamber liquid expelled from said nozzle by operation of said actuator, wherein said actuator is disposed so as to be able under an electric field applied between said electrode means to move in relation to said chamber in shear mode in the direction of said field to change the liquid pressure in said chamber and thereby cause droplet ejection from said nozzle.

4,879,569

MULTIPLE SOURCE CHARGED PARTICLE GENERATION

Igor Kubelik, Mississauga, Canada, assignor to Delphax Systems, Mississauga, Canada

Filed Dec. 14, 1988, Ser. No. 284,267

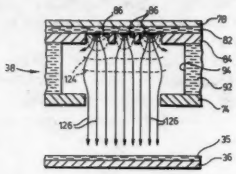
Int. Cl.[4] G01D *15/00*

U.S. Cl. 346—159 **13 Claims**

1. A charge generating device comprising:

first and second electrodes;

a dielectric between the first and second electrodes; and



the second electrodes defining independent discharge locations with each of said discharge locations comprising a plurality of discharge sites.

4,879,570

BROADCASTING WAVE RECEPTION ANTENNA

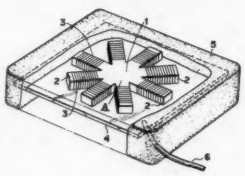
Akio Takizawa, and Syozo Saito, both of Saitama, Japan, assignors to Nippon Antenna Co., Ltd., Tokyo, Japan

Filed Mar. 16, 1988, Ser. No. 168,647

Claims priority, application Japan, Mar. 24, 1987, 62-69981; Jan. 28, 1988, 63-18664

Int. Cl.[4] H01Q *7/08*

U.S. Cl. 343—713 **12 Claims**



1. A broadcasting wave reception antenna apparatus comprising:

a flat magnetic member having a center portion and a plurality of projections extending radially outwardly from said center portion in respective directions which all lie in a common plane;

a plurality of coils, each said coil being wound around a respective said projection of said magnetic member, a first group of said coils being connected in series with each other between a first pair of first and second nodes, and the rest of said coils being a second group connected in series with each other between a second pair of first and second nodes;

a cable having two conductors which are each connected to said first node of a respective said pair;

a vehicle body wall having spaced first and second wall members; and

a soft resilient member having a large compression ratio, having a thickness greater than the distance between said first and second wall members, and having said magnetic member and said coils fully embedded therein, said resilient member being disposed between said first and second wall members under compression and said magnetic member and coils being spaced from each of said wall members.

4,879,571

DUPLEX PRINTING DEVICE

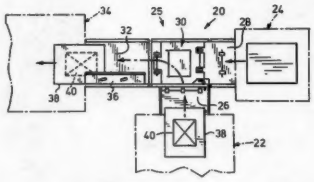
Paul E. Plasscheart, Limehouse, Canada, assignor to Delphax Systems, Mississauga, Canada

Filed Nov. 30, 1987, Ser. No. 126,160

Claims priority, application Canada, Dec. 3, 1986, 524416

Int. Cl.[4] G03B *27/32, 27/52*

U.S. Cl. 355—26 **5 Claims**



1. Apparatus for selectively imaging one side or both sides of sheets, the apparatus comprising:

first imaging means to image first sides of the sheets when both sides are to be imaged;

means defining a first entry path for receiving the sheets serially from the imaging means;

a transfer station for receiving the sheets from the first entry path in a first plane and including sheet inverting means for turning the sheets over and into a second plane adjacent to and spaced from the first plane;

means defining a second entry path for delivering sheets serially to be imaged on one side only, the second entry path delivering sheets to the transfer station in the second plane;

means defining an exit path for receiving sheets from the transfer station in said second plane;

second imaging means for receiving sheets from the exit path to image one side of the sheets originating from the second entry path and to image the second sides of sheets originating at the first imaging means; and

said sheet inverting means including a curler positioned in the first entry path for initiating a curl in the sheet so that the sheet then turns over, the curler being out of alignment with the second entry path so that sheets passing along the second entry path move past the curler without engagement.

4,879,572

READER-PRINTER

Kazuhiko Onuki, Tokyo; Masami Maetani, Ohmiya; Masahiko Ito, Yokohama, and Shinji Murata, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 74,146, Jul. 16, 1987, abandoned. This application May 13, 1988, Ser. No. 195,392

Claims priority, application Japan, Jul. 26, 1986, 61-176350; Nov. 8, 1986, 61-266196

Int. Cl.[4] G03B *13/28*

U.S. Cl. 355—45 **10 Claims**

1. A reader-printer comprising:

a first mirror rotatable to a first position in which it is capable of forming a reader optical path for projecting an image onto a screen and a second position in which it is capable of forming a printer optical path for projecting the image onto a photosensitive surface;

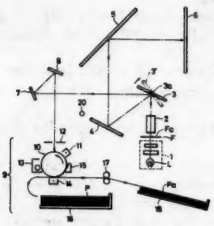
a second mirror disposed in said reader optical path for directing light reflected by said first mirror to said screen;

a third mirror disposed in said printer optical path for directing light reflected by said first mirror to said photosensitive surface;

drive means for rotating said first mirror to said first position and said second position; and

detecting means for detecting a quantity of light from said

image, said detecting means disposed outside said reader optical path and said printer optical path and disposed at a position where it receives the light reflected by said first



mirror when said first mirror is rotated to a predetermined angular position different from said first and second positions.

4,879,573

CLAMPING FRAME FOR CONTACT PRINTERS OF WORKING MASKS

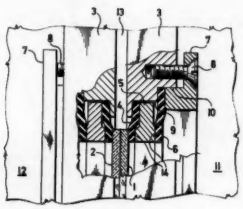
Bohumil Slavata, Prague, Czechoslovakia, assignor to TESLA, koncernovy podnik, Prague, Czechoslovakia

Filed Apr. 22, 1988, Ser. No. 185,004

Claims priority, application Czechoslovakia, Apr. 24, 1987, 2899-87

Int. Cl.[4] G03B *27/28*

U.S. Cl. 355—125 **7 Claims**



1. A clamping frame for a contact printer comprising a stable part and a mobile part of substantially equal design, each of said parts comprising a clamping frame body with a central opening, each body being separated by a central passage;

said central opening having a two stepped profile formed by an external recess and an internal recess, such that the central opening is smaller at said internal recess, facing said central passage;

a thrust frame and a supporting frame and a first and second packing;

said second packing lying adjacent said internal recess with and said supporting frame lying adjacent said second packing;

said first packing lying adjacent said external recess and said thrust frame lying adjacent said first packing.

4,879,574

COPYING APPARATUS HAVING AN AUTOMATIC DOCUMENT FEEDER AND AT LEAST TWO OPERATION MODES

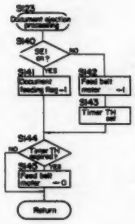
Minoru Nakamura, and Masazumi Ito, both of Toyohashi, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sep. 29, 1987, Ser. No. 102,580

Claims priority, application Japan, Jun. 13, 1987, 62-147206

Int. Cl.[4] G03G *21/00*

U.S. Cl. 355—204 **12 Claims**



1. A copying apparatus, comprising:

a document glass;

a document pressing means that can be opened and closed to the document glass;

means for feeding copying papers;

means for storing image formed papers;

image forming means that is operable not only in a first operation mode wherein the image of the document set on the document glass is formed onto the copying paper fed by the copying paper feeding means, and the image formed paper is ejected into the storing means, but may also be selectively operated in a second operation mode wherein the copying paper fed by the copying paper feeding means is ejected into the storing means without forming the image of the document;

means for detecting the opening action of the document pressing means;

means for raising an alarm upon the failure to detect the opening action of the document pressing means after the image forming operation; and

means for inhibiting the operation of the alarm means after the image forming operation in the second operation mode.

4,879,575

COPYING APPARATUS WITH PROVISION FOR DELAYED RESET IN THE EVENT OF PAPER EXHAUSTION

Syuzi Maruta, Toyokawa, and Masazumi Ito, Toyohashi, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Oct. 5, 1987, Ser. No. 104,376

Claims priority, application Japan, Oct. 7, 1986, 61-238567

Int. Cl.[4] G03G *21/00*

U.S. Cl. 355—208 **8 Claims**

1. A copying apparatus comprising:

means for forming an image on copy paper;

means for storing copy paper;

detection means for detecting a paper empty condition in said paper storing means;

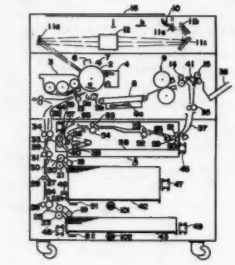
input means for inputting a copy condition;

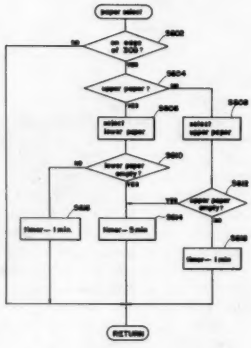
means for giving a copy instruction;

means for automatically resetting the input copy condition to a standard state if the copy instruction is not given within a first predetermined period of time after the operation of said image forming means; and

means for maintaining the copy condition input by said input

means for a second predetermined period of time, being longer than said first predetermined period of time, after the detection of the paper empty condition by said detection means and for automatically resetting the input copy condition to a standard state when said second predetermined period of timer has elapsed after detection of the paper empty condition.





4,879,576

EXPOSURE CONTROL DEVICE AND METHOD

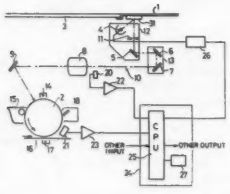
Yoshikazu Naito, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Mar. 10, 1988, Ser. No. 166,390

Claims priority, application Japan, Mar. 13, 1987, 62-59180; Mar. 13, 1987, 62-59181; Mar. 13, 1987, 62-59182

Int. Cl.[4] G03G *15/04, 21/00*

U.S. Cl. 355—214 **8 Claims**



1. A control system for varying the exposure of an original in an electrostatic image forming system, comprising:

a light source responsive to voltage input;

means for positioning an original document for exposure by the light source;

means for applying an initial predetermined voltage to the light source;

means for developing an electrostatic image of the original including a photosensitive member that received the image;

a reference pattern that is positioned for exposure by the light source and development by the photosensitive member;

means for sampling the image density of the reference pattern;

means for sampling the image density of the image of the reference pattern developed on the photosensitive member including a sensor;

memory means for storing a predetermined table of values corresponding to a relationship between the density of the reproduced reference pattern and the sensor;

means for defining a relationship between the light source voltage and the density of the reproduced reference pattern as modified by the value in the memory means;

comparator means for comparing the measured image density with a predetermined image density to produce a correction signal, and

means for providing a fixed increment adjustment of the relationship between the light source voltage and the density of the reproduced reference pattern in response to the correction signal, whereby a light surface voltage is determined for an exposure operation from the density of the reproduced reference pattern.

4,879,577

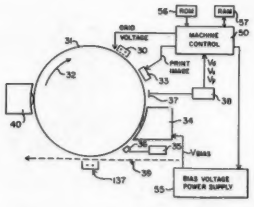
METHOD AND APPARATUS FOR CONTROLLING THE ELECTROSTATIC PARAMETERS OF AN ELECTROPHOTOGRAPHIC REPRODUCTION DEVICE

Saied A. Mabrouk, Boulder, and Gerald L. Wheeler, Longmont, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 19, 1988, Ser. No. 183,216

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—208 **18 Claims**



1. A method for establishing electrostatic parameters of a DAD electrophotographic reproduction device, said device having a photoconductor, a charging station for charging said photoconductor, an imaging station which is operable to form a discharged area latent image on said photoconductor in accordance with an image to be reproduced, and a developer station operable to deposit toner on said latent image, said developer station including a development electrode connected to a source of development electrode voltage, comprising the steps of:

determining the saturation voltage of said photoconductor;

establishing said electrostatic parameters as a function of said determined saturation voltage; and

adjusting the magnitude of said development electrode voltage as a function of said determined saturation voltage.

17. A DAD reproduction device comprising:

a reusable photoconductor that cycles through a series of

process stations during the process of producing reproductions, said process stations including in cycle order:

a controllable charging station operable to charge said photoconductor to an image background charge level;

a controllable intensity imaging station selectively operable to discharge said photoconductor to (1) a photoconductor-saturation latent image voltage level in a photoconductor image area, and (2) a relatively higher patch latent image voltage level in a photoconductor patch area;

charge sensing means operable to sense said photoconductor-saturation voltage level;

a developer station having a controllable development electrode bias voltage source, and being operable to deposit a high quantity of toner on said photoconductor image area, and a lower quantity of toner on said photoconductor patch area; and

toner concentration control means operable to determine the quantity of toner deposited on said photoconductor patch area;

reference means providing a reference photoconductor charge vector and a reference development bias vector;

means for controlling said charge source as a function of said photoconductor-saturation voltage level and said charge vector reference; and

means controlling said bias voltage source as a function of said photoconductor-saturation voltage level and said bias vector reference.

4,879,578

PAPER FEEDING DEVICE AND A PAPER GUIDING DEVICE IN A COPYING APPARATUS

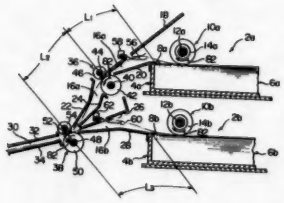
Masahiko Hisajima; Hiroshi Kimura, both of Osaka; Yutaka Shigemura, Hyogo; Isao Yada, Osaka; Yoichiro Irie, Osaka; Kiyoshi Morimoto, Osaka, and Takashi Nagashima, Osaka, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 349,544, Feb. 17, 1982, abandoned. This application Jan. 14, 1985, Ser. No. 691,372

Claims priority, application Japan, Mar. 2, 1981, 56-28445; Mar. 10, 1981, 56-32265[U]; Mar. 10, 1981, 56-32266[U]

Int. Cl.[4] B65H *3/44*

U.S. Cl. 355—234 **4 Claims**



1. In a copying machine including an original supporting plate, an optical unit, means defining a copying zone through which copying paper passes to have formed thereon a copy of an original document supported on the original supporting plate, means reciprocally mounting one of the original supporting plate and the optical unit for scanning an image of the original document supported on the original supporting plate to enable formation of a copy of the original document on copying paper passing through the copying zone, means defining a first paper loading section and a second paper loading section, each paper loading section to be loaded with a stack of copying paper sheets, a first paper delivery mechanism and a second paper delivery mechanism, the paper delivery mechanisms disposed respectively in the first and second paper loading sections, means defining a first paper introducing passage and a second paper introducing passage, the paper introducing passages extending respectively from the first and second paper loading sections and terminating in a common point of junction, means defining a paper conveying passage extending from the common point of junction to the copying zone, and means responsive to performance of a copying operation for selectively actuating either the first paper delivery mechanism or the second paper delivery mechanism, the improvement comprising a first conveyor roller pair and a second conveyor roller pair disposed respectively in the first paper introducing passage and at the point of junction or at a downstream part of the paper conveying passage such that each of the length of the path of a copying paper between the first paper loading section and the first conveyor roller pair and the length of the path of a copying paper between the first conveyor roller pair and the second conveyor roller pair is shorter than the minimum length in the moving direction of a paper sheet loaded in the first paper loading section and the length of the path of a copying paper between the second paper loading section and the second conveyor roller pair is shorter than the minimum length in the moving direction of a paper sheet loaded in the second paper loading section, drive means for simultaneously driving the first and second conveyor roller pairs, a first detector positioned in the first paper introducing passage upstream of the first conveyor roller pair and responsive to a copying paper delivered from the first paper loading section by the action of the first paper delivery mechanism assuming a buckled condition as a result of the leading edge thereof abutting against the first conveyor roller pair for detecting such buckled copying paper and stopping the operation of the first paper delivery mechanism, a second detector positioned in the second paper introducing passage upstream of the second conveyor roller pair and responsive to a copying paper delivered from the second paper loading section by the action of the second paper delivery mechanism assuming a buckled condition as a result of the leading edge thereof abutting against the second conveyor roller pair for detecting such buckled copying paper and stopping the operation of the second paper delivery mechanism, and means responsive to scanning movement of the one of the original supporting plate and the optical unit to a first predetermined position when the first detector has detected a copying paper in the buckled condition for actuating the drive means to simultaneously drive the first and second conveyor roller pairs and transport paper along said paper conveying passage and responsive to scanning movement of the one of the original supporting plate and the optical unit to a second predetermined position when the second detector has detected a copying paper in the buckled condition for actuating the drive mechanism to simultaneously drive the first and second conveyor roller pairs and transport paper along the paper conveying passage, whereby the copying paper is conveyed through the copying zone in synchronism with the scanning of the image of the original document to properly position the copy thereof on the copying paper regardless of whether the copying paper came from the first paper loading section or the second paper loading section.

4,879,579

IMAGE RECORDING APPARATUS

Takemi Yamamoto, Nagoya, and Kenji Sakakibara, Ichinomiya, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Nov. 17, 1988, Ser. No. 272,722

Claims priority, application Japan, Nov. 27, 1987, 62-301105

Int. Cl.[4] G03G *15/00, 15/01*

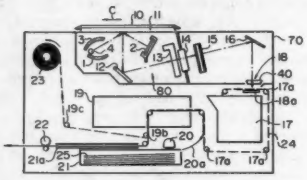
U.S. Cl. 355—235 **11 Claims**

1. An image recording apparatus for recording an image corresponding to image information on an original, onto a photo-sensitive recording medium by a slit scanning exposure system, which comprises:

selection means for selectively designating resolution of the image to be recorded onto said recording medium;

resolution control means for generating a control signal on the basis of said designated resolution;

slit-width adjusting means operative in response to said control signal from said resolution control means, for adjusting an opening width of a variable exposure slit arranged at an exposure station at which said recording medium is exposed; and



scanning-speed adjusting means operative in response to said control signal from said resolution control means, for adjusting scanning speed at which said original is scanned.

4,879,580

IMAGE PROCESSING APPARATUS

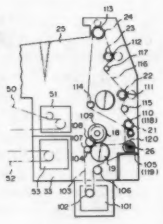
Tokuzo Kaneda, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jun. 8, 1988, Ser. No. 203,996

Claims priority, application Japan, Jun. 8, 1987, 62-141384; Apr. 27, 1988, 63-102431

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—295 **10 Claims**



1. An image processing apparatus comprising:

a photoconductive element;

an optical unit for forming a latent image on said photoconductive element;

a developing device for developing the latent image on said photoconductive element to produce a toner image;

a transferring device for transferring the toner image from said photoconductive element to a transfer material;

a fixing device constituted by a fixing roller and a pressing roller for fixing the toner which has been transferred to the transfer material;

fixing device drive means for driving said fixing device;

first support means for supporting said photoconductive element and said optical unit; and

second support means for supporting said fixing device and said fixing device drive means, said second support means being isolated from said first support means.

4,879,581

TRANSFERRED ELECTRON DEVICE WITH PERIODIC BALLISTIC REGIONS

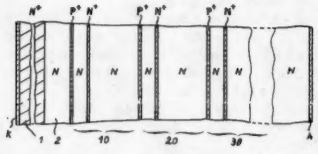
Félix Diamand, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Jul. 9, 1987, Ser. No. 71,361

Claims priority, application France, Jul. 9, 1986, 86 09976

Int. Cl.[4] H01L *27/26, 27/12, 47/02*

U.S. Cl. 357—3 **3 Claims**



1. A transferred electron device including an N+ doped semiconductor substrate having one face provided with a metal contact forming a cathode and an other face coated with an N doped semiconductor inut layer followed by an active semiconductor structure with a metal contact forming an anode, wherein said semiconductor structure is a periodic structure including a succession of elementary cells, each cell having a short N doped ballistic region between two very thin semiconductor layers, strongly doped respectively P+ and N+, and a longer N doped transit region, said ballistic region allowing the electrons to be brought to a high energy level in a time less than the collision time, and the transit region allowing the electron energy to be brought down by relaxation to a value very much less than the transfer energy.

4,879,582

FIELD-EFFECT TRANSISTOR

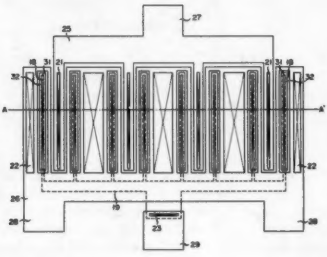
Takashi Kimura; Takao Kato, and Kazuo Endo, all of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 23, 1987, Ser. No. 65,596

Claims priority, application Japan, Jun. 25, 1986, 61-148604

Int. Cl.[4] H01L *29/78*

U.S. Cl. 357—23.12 **5 Claims**



1. A field-effect transistor device which comprises:

a semiconductor substrate of a first conductivity type;

drain and source regions of a second conductivity type formed in said semiconductor substrate;

a channel region of said first conductivity type positioned between said drain and source regions;

a drain electrode layer having a finger portion extending on and connected to said drain region and a base portion extending beyond said drain region;

a source electrode layer having a finger portion extending

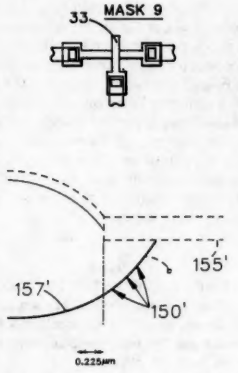
on and connected to said source region and a base portion extending beyond said source region;
a first gate insulation layer formed on said semiconductor substrate;
a gate electrode layer formed on a portion of said first gate insulation layer on said channel region and having an extension protruding beyond said channel region;
a second gate insulation layer formed on said gate electrode layer;
a gate bonding electrode layer connected to said gate electrode layer via a first contact hole formed in said second gate insulation layer; and
a conductive layer connected to said gate electrode layer via a second contact hole formed in said second gate insulation layer, said conductive layer being formed above said channel region.

4,879,583

DIFFUSED FIELD CMOS-BULK PROCESS AND CMOS TRANSISTORS

Frank Z. Custode, Norco, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Division of Ser. No. 837,560, Mar. 3, 1986, Pat. No. 4,749,662. This application Oct. 7, 1987, Ser. No. 105,413
Int. Cl.[4] H01L *27/02*
U.S. Cl. 357—42 **3 Claims**



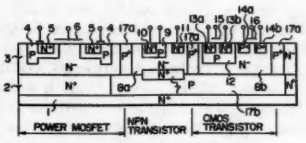
1. A CMOS device comprising, in combination:
a P doped substrate;
an N-channel transistor having an active region in the substrate surrounded by field oxide over the P doped substrate and in the P doped substrate;
a P diffused field region in the substrate beneath at least a portion of the field oxide contiguous with the active region;
an N+ source and drain in the active region and a doped polysilicon gate over insulation between the source and drain;
insulated electrical connections to each of the source, drain and gate;
said field oxide underlying the active region for no greater distance than 0.225 microns at any point around the active region and the field oxide exhibiting an abrupt transition from the active region to the field region characterized by a slope of approximately 3.8;
a P-channel transistor having an active region in the substrate surrounded by field oxide;
an N-diffused well under the P-channel transistor; a P+ source and drain in the P-channel active region and a doped polysilicon gate between the source and drain;
insulated electrical connections to each of the P-channel transistor source, drain and gate; and,
said field oxide underlying the P transistor active for no greater distance than 0.225 microns at any point around said last mentioned active region and said field oxide exhibiting an abrupt transition from the P-channel transistor active region to the P-channel section field region characterized by a slope of approximately 3.8.

4,879,584

SEMICONDUCTOR DEVICE WITH ISOLATION BETWEEN MOSFET AND CONTROL CIRCUIT

Yosuke Takagi, Yokohama; Yu Ohata, Tokyo; Koichi Kitahara, Kawasaki, and Tsuyoshi Kuramoto, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 10, 1988, Ser. No. 154,275
Claims priority, application Japan, Feb. 13, 1987, 62-29553
Int. Cl.[4] H01L *27/02*
U.S. Cl. 357—43 **10 Claims**



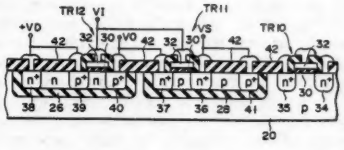
1. A semiconductor device comprising:
a power gate-insulated MOS field effect transistor having a drain region and a control circuit element formed on a common semiconductor substrate, said drain region having a high and a low resistance region, said high resistance region overlaying said low resistance region;
a first area including at least a portion of said high resistance region of the drain region of the power gate-insulated MOS field effect transistor, said first area having a predetermined resistivity value; and
a second area including at least a portion of the area in which said control circuit element is formed, said second area being disposed contiguous to said first area, said second area having a resistivity value less than said predetermined resistivity value of the first area.

4,879,585

SEMICONDUCTOR DEVICE

Toshiro Usami, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 80,487, Jul. 31, 1987, abandoned, which is a continuation of Ser. No. 717,694, Mar. 29, 1985, abandoned. This application Jun. 15, 1988, Ser. No. 206,903
Claims priority, application Japan, Mar. 31, 1984, 59-63567
Int. Cl.[4] H01L *27/08*
U.S. Cl. 357—49 **12 Claims**



1. A semiconductor device, which is subjected to a thermal oxidation treatment process at a temperature of over 900° C. during manufacture of the device, comprising:

a wafer having a semiconductor substrate comprised of one conductivity type semiconductor material and having a main surface divided into a plurality of chip forming areas, each chip forming area including (1) at least one insulation layer of silicon dioxide, (2) at least one semiconductor region insulated from said semiconductor substrate by said insulation layer, and (3) a main surface substantially in the same plane as the main surface of said semiconductor substrate;

an array of semiconductor memory elements formed in said semiconductor substrate included in said chip forming area, said array of semiconductor memory elements formed in said semiconductor substrate constituting a semiconductor memory;

semiconductor elements formed in said semiconductor region, said semiconductor elements formed in said semiconductor region constituting a data processing unit for processing data stored in said semiconductor memory; and

means for preventing warping of said wafer resulting from said thermal oxidation treatment process, said means comprising

(1) the total area of the main surface of said wafer which is occupied by semiconductor regions insulated from said semiconductor substrate by insulation layers in said chip forming areas being less than 30% of the area of the main surface of said wafer which wafer area includes the total area of the main surfaces of said semiconductor regions and the total area of the main surfaces of said insulation layers in said chip forming areas, and

(2) those portions of said semiconductor substrate in each of said chip forming areas which lie under at least part of said insulation layers and at least part of said array of semiconductor memory elements in said semiconductor substrate being integrally formed of said one conductivity type semiconductor material.

4,879,586

SEMICONDUCTOR COMPONENT

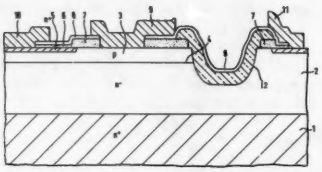
Doris Brostrom, and Lennart Ryman, both of Heilbronn, Fed. Rep. of Germany, assignors to Telefunken electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Nov. 5, 1986, Ser. No. 927,492

Claims priority, application Fed. Rep. of Germany, Nov. 29, 1985, 3542166

Int. Cl.[4] H01L *21/516, 21/31*

U.S. Cl. 357—54 **10 Claims**



1. In a high-voltage transistor including a semiconductor body having emitter, base and collector zones, respective electrodes for said emitter, base and collector zones disposed on a surface of said semiconductor body, an oxygen or nitrogen doped silicon layer disposed on at least the portions of the surface of said semiconductor body between said electrodes, and a glass layer provided between said doped silicon layer and said surface of said semiconductor body, the improvement wherein the portion of said doped silicon layer disposed between said base and collector electrodes is connected at one of its ends to said base electrode and is connected at its other end to said collector electrode.

4,879,587

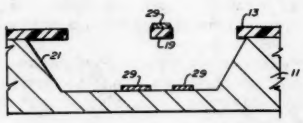
APPARATUS AND METHOD FOR FORMING FUSIBLE LINKS

John H. Jerman, Palo Alto, Calif., assignor to Transensory Devices, Inc., Fremont, Calif.

Filed Nov. 13, 1986, Ser. No. 930,653

Int. Cl.[4] H01L *27/04, 23/52*

U.S. Cl. 357—55 **9 Claims**



1. A fusible link comprising:

a semiconductor substrate;

an electrically insulating layer disposed on said substrate;

a pair of conductor elements on the surface of said insulating layer opposite said substrate;

a fuse conductor layer on the surface of said insulating layer opposite said substrate electrically coupling said conductor elements; and

said insulating layer and said substrate defining a cavity adjacent said fuse conductor layer such that a bridge is formed over said cavity, said bridge being a portion of said insulating layer upon which said fuse conductor layer is disposed, said fuse conductor layer on said bridge being sized such that a predetermined electrical power input to said fuse conductor layer produces an open circuit between said pair of conductor elements, the relative sizing of said fuse conductor layer on said bridge and said portion of said insulating layer being such that said portion of said insulating layer provides substantial mechanical support for said portion of said fuse conductor layer thereon and, in conjunction with said cavity, substantially decreases the thermal conductivity from said fuse conductor layer thereon to said substrate.

4,879,588

INTEGRATED CIRCUIT PACKAGE

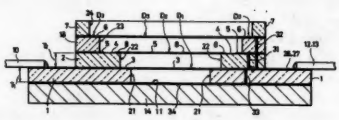
Akira Ohtsuka; Tomoji Goto, both of Hyogo, and Masao Ida, Tokyo, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka and Nippon Telegraph and Telephone Corporation, Tokyo, both of, Japan

Filed Jan. 19, 1988, Ser. No. 145,068

Claims priority, application Japan, Jan. 19, 1987, 62-10929

Int. Cl.[4] H01L *23/48, 29/44, 29/60, 39/02*

U.S. Cl. 357—68 **12 Claims**



1. An integrated circuit package comprising:

a first ceramic plate formed with a first opening at its central portion and provided with a plurality of signal transmitting metallized wiring connections on its upper surface extending from said first opening to respective external edges of said first ceramic plate, and having a plurality of electric power supplying metallized wiring traces extending from said external edge to an intermediate portion of said first ceramic plate inward of said first opening;

a plurality of ceramic plates, laminated on said first ceramic plate, and each having a respective opening, each of which is larger in size than said first opening and each

having a larger opening than any openings on ceramic plates therebelow to form a stepwise increase in opening sizes, each of said ceramic plates having a metallized power-source, extending continuously along four sides of a surface thereof;

a metal bottom plate of good thermal conductively fixed to a lower surface of said first ceramic plate and provided with an electric conductor on at least a whole upper surface thereof; and

a plurality of signal transmitting lead frames, each fixed to an external end of one of said signal transmitting metallized wiring connections at said external edge of said first ceramic plate;

a plurality of electric-power supplying lead frames, each fixed to an external end of a respective one of said electric-power supplying metallized wiring traces,

said plurality of ceramic plates formed with a plurality of through-holes for connecting said electric-power supplying metallized wiring traces, said metalized power-source surface, and said electric conductor on the upper surface of said bottom plate to each other;

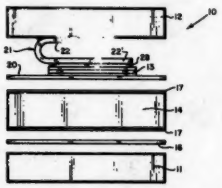
wherein a size of said wiring and thickness of said ceramic layers is maintained constant so that said signal transmission metallized wiring connections have a characteristic impedance determined by a ratio L/C of a capacitance C between the respective electric conductors on the upper surfaces of said metal bottom plate and a second ceramic plate, to an inductance L determined by said size of said wirings, is maintained constant.

4,879,589

HERMETIC LEADLESS SEMICONDUCTOR DEVICE PACKAGE

Frederic Saint-Cyr, Signal Hill, Calif., assignor to Semetex Corporation, Torrance, Calif.

Filed Jan. 25, 1988, Ser. No. 148,017
Int. Cl.[4] H01L *23/42*
U.S. Cl. 357—79 **6 Claims**



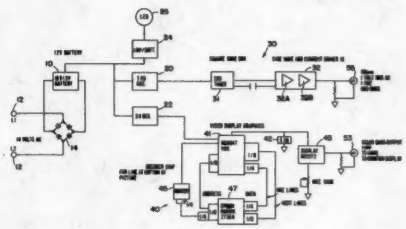
1. An hermetic leadless package for a planar silicon diode chip, comprising a planar base made of conductive material for forming a first contact to one side of said diode chip, a spacing frame of dielectric material sealed on said base and forming a cavity dimensioned for receiving said diode chip, said diode chip being disposed in said cavity with said one side electrically connected to said base, a cover made of conductive material sealed on said frame for forming a second contact to said diode chip on a side thereof opposite said one side of said diode chip and sealed over said spacing frame, and a spring means made of conductive material disposed between said cover and said diode chip for electrically connecting said cover to a side of said diode chip opposite said one side.

4,879,590

COLOR BAR AND AUDIO SIGNAL GENERATOR

Walter K. Guillot, 4646 Chelsea Dr., Baton Rouge, La. 70809, and Robert D. Brinkman, Chanute, Kans., assignors to Walter K. Guillot and L. J. Thibodeaux, both of Baton Rouge, La., a part interest

Filed Apr. 22, 1988, Ser. No. 185,067
Int. Cl.[4] H04N *17/02*
U.S. Cl. 358—10 **31 Claims**



1. A hand-held modulator which comprises:

(a) a self-contained electrical power source;

(b) first means converting power from said source into a 1000 cycle line wave audio tone signal of one volt, peak to peak at zero levelout;

(c) first output connection means for said signal;

(d) second means converting power from the power source at least into composite video color bars of one volt, peak to peak, of the U.S. NTSC standard type; and

(e) second output connection means for such composite video color bars;

said first means comprising:

(i) a square wave driver adapted to be energized by the self-contained power source, and

(ii) a sine wave and current driver integrated circuit to receive the output signal from the square wave driver and adapted to transform such signal into a 1000 cycle sine wave audio tone signal of one volt, peak to peak at zero levelout.

10. A hand-held modulator which comprises:

(a) a self-contained electrical power source;

(b) first means converting power from said source into a 1000 cycle line wave audio tone signal of one volt, peak to peak at zero levelout;

(c) first output connection means for said signal;

(d) second means converting power from the power source at least into composite video color bars of one volt, peak to peak, of the U.S. NTSC standard type; and

(e) second output connection means for such composite video color bars;

said second means including an EPROM matrix coupled to receive the outputs from a video graphics circuit and having decoder means interposed between a loop returning the output from the EPROM matrix to the video graphics circuit and thence to output driver means producing an output of color bars at one volt peak to peak into a 75 ohm load.

4,879,591

IMAGE PICKUP APPARATUS COMPENSATING AN IMAGE SIGNAL FOR VARIATIONS IN COLOR TEMPERATURE

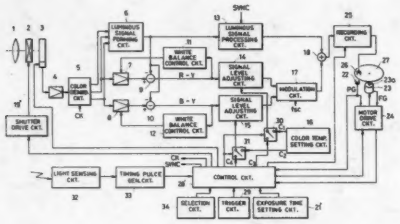
Masahiro Takei, Yohokama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 16, 1987, Ser. No. 3,771

Claims priority, application Japan, Jan. 31, 1986, 61-18191; Jan. 31, 1986, 61-18192; Jan. 31, 1986, 61-18193

Int. Cl.[4] H04N *9/04*

U.S. Cl. 358—29 C **40 Claims**



1. An image pickup apparatus for picking up an image under an illumination whose color temperature changes periodically, said apparatus comprising:

image pickup means for producing an image signal in response to a received image;

detection means for detecting a phase relationship between a timing of producing the image pickup signal and the change in the color temperature of the illumination;

control means for (1) controlling the timing of producing said image signal in the image pickup means based on the output of the detection means, and (2) for controlling color balance among a plurality of color signals involved in said image signal in accordance with the detected phase relationship.

4,879,592

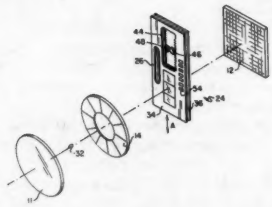
CAMERA WITH TWO-BLADED SHUTTER MECHANISM WITH MULTIPLE FILTER APERTURES DISPOSED FOR RELATIVE MOVEMENT TO PROVIDE SEQUENTIAL COLOR SEPARATION EXPOSURES

Paul W. Ernest, Arlington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed May 2, 1988, Ser. No. 189,374

Int. Cl.[4] H04N *9/07, 1/028;* **G03B** *9/08, 33/08*

U.S. Cl. 358—42 **12 Claims**



1. A color separation shutter mechanism comprising:

a pair of elongated shutter blade elements disposed in at least partially superimposed relation for relative movement with respect to each other along respective predetermined paths which cross a select image light path;

drive means operatively connecting each of said shutter blade elements for moving each of said blade elements independently of each other along said predetermined paths across the select image light path;

one of said blade elements comprising at least a first filtered aperture for transmitting lightwaves therethrough within a first select range of wavelengths and a second filtered aperture for transmitting lightwaves therethrough within a second select range of wavelengths different from said first select range, and the other of said blade elements comprising at least one aperture for transmitting lightwaves therethrough at least within all the select ranges transmitted by all the apertures of said one shutter blade element, said drive means being operable to position said shutter blade elements relative to each other in at least a first position wherein one of said filtered apertures from said one blade element overlaps said one aperture from said other blade element to transmit image defining light within said first wavelength range along said image light path and then a second position wherein the other of said filtered apertures from said one blade element overlaps said one aperture from said other blade element to transmit image defining light within said second wavelength range along said image light path, and wherein said other shutter blade element includes an opaque portion immediately adjacent its said one aperture, said opaque portion being drivable into scene light blocking position along said image light path during the intervals during which said one blade element is driven from one filtered aperture position aligned with the image light path to another filtered aperture position aligned with the image light path and at the end of an exposure interval.

4,879,593

METHOD OF AND APPARATUS FOR PERFORMING LOW-VOLTAGE CORRECTION OF HIGH-VOLTAGE DEFLECTION SIGNALS FOR ELECTROSTATIC-DEFLECTION CAMERA TUBES IN A COLOR VIDEO CAMERA

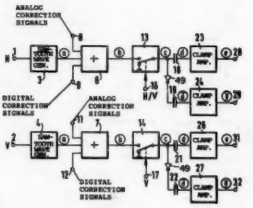
Harald Eschelbach, Mannheim, and Wolfram Klemmer, Langen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 4, 1988, Ser. No. 164,014

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1987, 3708229

Int. Cl.[4] H04N *9/093, 3/23, 5/228;* **H03K** *4/08*

U.S. Cl. 358—51 **8 Claims**



1. Method of producing deflection signals for electrostatic deflection camera tubes for producing color video signals having horizontal (H) and vertical (V) video blanking intervals, said method including the steps of generating sawtooth deflection signals of horizontal (H) scanning frequency and of vertical (V) scanning frequency at low voltage, then superposing correction signals thereon to modify the signal position, magnitude and shape and thereby produce corrected horizontal (H) and vertical (V) deflection signals, followed by capacitively converting said corrected H and V deflection signals into high voltage horizontal (H) and vertical (V) deflection signals, and further comprising the steps of:

prior to the step of capacitively converting corrected H and V deflection signals into high voltage signals, blanking out

said corrected H and V deflection signals and substituting a keyed-in low voltage reference voltage for intervals within the said respective H and V blanking intervals of said color video signals and after said converting step, clamping said high voltage H and V deflection signals to a high voltage reference potential in substantially the same intervals in which the respectively corresponding corrected H and V deflection signals were blanked out and said keyed-in low voltage reference voltage was substituted.

4,879,594

REPRODUCTION OF COLORED IMAGES

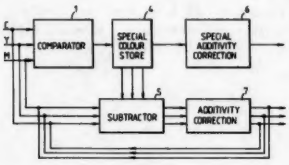
Peter W. Stansfield, Hertfordshire, and Alastair Reed, Bedfordshire, both of England, assignors to Crosfield Electronics Limited, London, England

Filed Sep. 23, 1988, Ser. No. 248,072

Claims priority, application United Kingdom, Sep. 23, 1987, 8722406

Int. Cl.[4] H04N *1/46*

U.S. Cl. 358—80 **9 Claims**



1. A method of reproducing a coloured original image represented by first signals, defining the colour content of pixels of said original image in terms of a first set of colour components, in which at least two separations are prepared representing respective colour components of a second set different from said first set comprises for each pixel of said original image

(i) ranking said colour components of said second set in order of similarity to said pixel;

(ii) selecting a value for the highest ranked colour component for which each of said first set of colour component values defining said selected colour component does not exceed the corresponding pixel values;

(iii) adjusting said pixel values to take account of the selected value of said colour component of said second set; and,

(iv) repeating steps (ii) and (iii) for each of the remaining colour components of said second set in the order of ranking.

4,879,595

TECHNIQUE FOR REPRODUCING AN IMAGE READ FROM A COLOR ORIGINAL

Hiroshi Niki, Hachioji; Masahiko Matsunawa, Fussa; Hiroyuki Yamamoto, Yokohama, and Yoshinori Abe, Hino, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Oct. 17, 1986, Ser. No. 921,324

Claims priority, application Japan, Oct. 22, 1985, 60-236767; Dec. 26, 1985, 60-294891; Dec. 26, 1985, 60-294893; Dec. 26, 1985, 60-294895; Dec. 26, 1985, 60-294898; Dec. 26, 1985, 60-294900

Int. Cl.[4] G03F *3/08;* **H04N** *1/46*

U.S. Cl. 358—80 **19 Claims**

1. A color image processing apparatus comprising:

optical means for obtaining optical color information corresponding to a plurality of colors of an original color image,

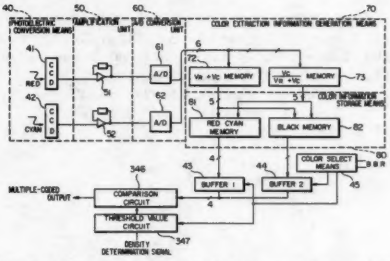
photoelectric conversion means for converting said optical color information into respective electric signals,

color extraction means for extracting color information signals from said electric signals,

selecting means for generating selection signals to sequentially select said extracted color information signals,

control means for outputting selected color information signals based on said extracted color information signals and said selection signals, and

multiple coding means for coding said outputted selected color information signals into multiple coded signals by comparing said outputted selected color information signals with a threshold value,



wherein said control means includes means for providing a luminance signal obtained from said color extraction means and for inputting the luminance signal to said multiple coding means in response to a monochrome code selection signal from said selecting means to enable said original color image to be reproduced as a monochrome image.

4,879,596

STEREOSCOPIC CAMERA APPARATUS WHICH INCORPORATES CAMERAS AND CAN COMMONLY ADJUST DIRECTIONS OF THE CAMERAS

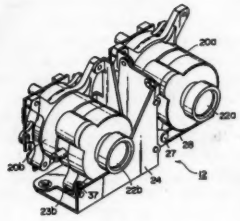
Kenichi Miura, and Hiromichi Kobayashi, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 5, 1989, Ser. No. 293,672

Claims priority, application Japan, Jan. 8, 1988, 63-1195

Int. Cl.[4] H04N *13/02*

U.S. Cl. 358—88 **6 Claims**



1. An electronic image pickup device comprising:

first and second image pickup means which are independent of each other so as to obtain a stereoscopic image;

a supporting member which can support said first and second image pickup means so that optical axes of said first and second image pickup means are directed in the same direction;

first and second supporting means for supporting said first and second image pickup means on said supporting member to be pivotal in a first plane direction so as to perform adjustment in the first plane direction perpendicular to the optical axes of said first and second image pickup means;

third supporting means for supporting said first or second image pickup means on said supporting member to be pivotal in a second plane direction so as to perform adjust-

ment in the second plane direction perpendicular to the first plane direction; and

fourth supporting means for supporting said second or first image pickup means on said supporting member to be pivotal in a third plane direction so as to perform adjustment in the third plane direction perpendicular to the first and second plane directions.

4,879,597

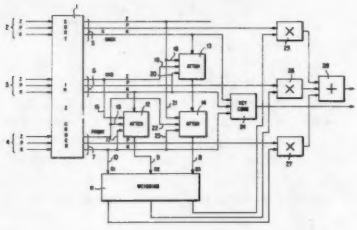
PROCESSING OF VIDEO IMAGE SIGNALS

Nicholas Barton, Wokingham; Robert Billing, Crowthorne, and Paul K. Burgess, Wokingham, all of Great Britain, assignors to Questech Limited, Wokingham, England

Filed Jan. 26, 1988, Ser. No. 148,610

Int. Cl.[4] H04N *5/262, 13/00, 13/02*

U.S. Cl. 358—88 **9 Claims**



1. A method of processing a video image signal, wherein in order to enable image information from said signal to be modified in accordance with an apparent position of said information in three dimensional space with reference to a two dimensional image screen, there is provided in association with said image signal a Z-axis reference signal the value of which represents the instantaneous distance of the scanning point of the video raster of said screen, in a direction perpendicular to the plane of the image screen, from a plane the position of which is computed in three dimensions with reference to the plane of the image screen and which is intended to be represented as containing the relevant image information of the video signal, wherein the plane which is to be represented as containing said image information is a plane that is inclined with reference to said image screen and said Z-axis signal is derived for each field of the image signal from three computed, fixed values, namely a first value corresponding to the distance from the origin of the video raster to said inclined plane, in a direction perpendicular to the image screen, and second and third values corresponding to the rates of change of said distance in the horizontal and vertical directions of the image screen, by continuously incrementing said first value with said second and third values in synchronism with the movement of the scanning point of said video raster.

4,879,598

INFRARED VIDEO CAMERA SHADING CORRECTION DEVICE

Toshiki Seto, Kanagawa, Japan, assignor to Mitsubishi Denki K.K., Tokyo, Japan

Filed Nov. 28, 1988, Ser. No. 276,893

Claims priority, application Japan, Jan. 22, 1988, 63-12035

Int. Cl.[4] H04N *5/33, 5/14*

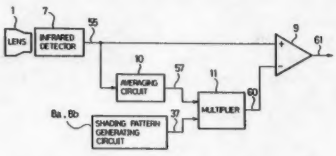
U.S. Cl. 358—113 **2 Claims**

1. A device for correcting a shading in an infrared video camera including an optical section and an infrared image pickup section, which comprises:

an averaging circuit for averaging during a few frames an output of said infrared image pickup section to provide an average output;

a shading pattern generator for generating a shading pattern signal similar to that of said optical section;

a multiplier for multiplying said average output by said



shading pattern signal to provide a multiplication output; and

a subtractor for subtracting said multiplication output from an infrared video output of said image pickup section.

4,879,599

METHOD OF SUB-SAMPLING INTERPOLATION

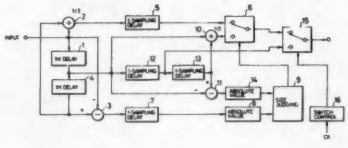
Tsutomu Honda, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Mar. 31, 1988, Ser. No. 176,002

Claims priority, application Japan, Mar. 31, 1987, 62-77994

Int. Cl.[4] H04N *7/13*

U.S. Cl. 358—138 **7 Claims**



1. A method of sub-sampling interpolation in a sub-sampling transmission system comprising the steps of:

successively transmitting sampled values obtained by sub-sampling a picture signal in each of a plurality of successive periods, each having a predetermined length, said plurality of successive periods being N times the period of one picture field (N being a natural number);

receiving said transmitted sampled values; and

interpolating non-transmitted sampled values in each of said periods of predetermined length from said sampled values transmitted within at least two periodsampled values in each of said periods of predetermined length from said sampled values transmitted within at least two periods of predetermined length, said two periods including the period of said non-transmitted sampled values, so as to reproduce said picture signal; wherein said interpolation step comprises the steps of:

calculating two one-directional interpolation sampled values for interpolating said non-transmitted sampled values with sampled values which are part of said sampled values transmitted in said two periods of predetermined length and are obtained at two groups of sampling points arranged respectively in the horizontal scanning direction and in the vertical scanning direction with respect to sampling points of said non-transmitted sampled values;

detecting two one-directional high frequency components at said sampling points of said non-transmitted sampled values using said sampled values at said two groups of sampling points, respectively, arranged in the horizontal scanning direction and in the vertical scanning direction;

comparing respective absolute values of said two one-directional high frequency components with each other;

mixing said two interpolation sampled values with each other, with the ratio of the one of said two interpolation sampled values in the direction along which said absolute

value is smaller than the other absolute value along the other direction to the other one of said two interpolation sampled values being larger than 1; and

interpolating said non-transmitted sampled values from the two mixed interpolation sampled values.

4,879,600

IMAGE SENSING APPARATUS WITH CONTROL FOR VARYING THE READOUT METHODOLOGY

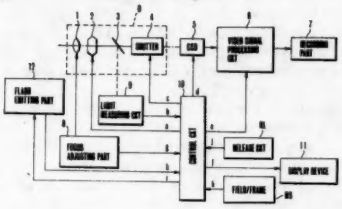
Makoto Ise, Tokyo, and Tadashi Okino, Kanagawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

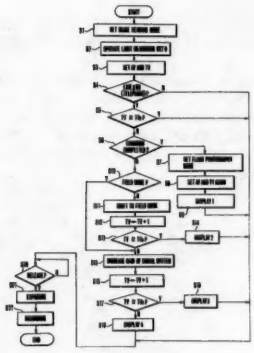
Filed Mar. 21, 1988, Ser. No. 170,767

Claims priority, application Japan, Mar. 27, 1987, 62-071596; Mar. 27, 1987, 62-071598; May 18, 1987, 62-118863

Int. Cl.[4] H04N *5/238*

U.S. Cl. 358—213.19 **25 Claims**





1. An image sensing apparatus comprising:

(a) an optical system for forming an image of an object to be photographed;

(b) image sensing means for photo-electrically converting said formed image into an electrical image signal to be accumulated; and

(c) control means for changing a method for reading out said electrical image signal from said image sensing means in accordance with information on a focal length of said optical system.

4,879,601

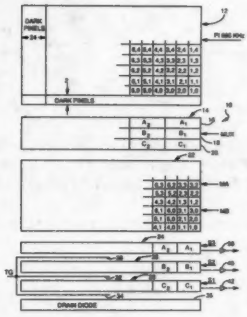
SYSTEM AND METHOD OF PROVIDING IMAGES FROM SOLID STATE SENSOR

Arnold L. Buck, Watertown, and Allan C. Green, Framingham, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Nov. 14, 1988, Ser. No. 271,006

Int. Cl.[4] H04N *3/14*

U.S. Cl. 358—213.22 **6 Claims**



1. In an electronic imaging camera of the type which can be selectively operated in either a moving or still picture mode of operation and including a solid state image sensor comprising: a two-dimensional light sensing array including a plurality of photoresponsive pixel elements arranged in columns and rows, each photoresponsive pixel element responding to incident image defining light to provide a corresponding electronic information signal, a two-dimensional memory including a plurality of electronic information signal storage elements arranged in columns and rows, means for transferring the electronic information signal from the photoresponsive pixel elements to the storage elements in a manner whereby the electronic information signals from the rows of photoresponsive pixel elements are transferred to the columns of storage elements, and register means for transferring the electronic information signals from the memory in a select order whereby at least two electronic information signals from different columns of photoresponsive elements in the light sensing array can be simultaneously transferred during the moving picture mode of operation, the improvement including timing control means for transferring the electronic information signals during said still picture mode of operation from said memory array by way of a single register in a manner whereby the electronic information signals from the pixels of each succeeding row of pixels of the light sensing array are transferred in ordered groupings of pixels in which the pixels of each group are interspersed with the pixels of the remaining groups.

4,879,602

ELECTRODE PATTERNS FOR SOLID STATE LIGHT MODULATOR

William E. Glenn, Ft. Lauderdale, Fla., assignor to New York Institute of Technology, Old Westbury, N.Y.

Continuation-in-part of Ser. No. 94,382, Sep. 4, 1987. This application Aug. 18, 1988, Ser. No. 232,923

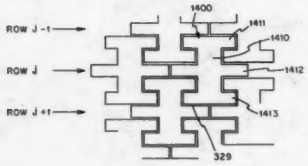
Int. Cl.[4] H04N *5/74*

U.S. Cl. 358—233 **20 Claims**

1. In a video display apparatus for generating images represented by input video signals, said apparatus including: an array of semiconductor devices arranged in a pattern of rows and columns and having respective electrodes to which charge can be applied in accordance with the input video signals; a layer of deformable material disposed over said electrodes; a conductive/reflective layer disposed over said deformable

layer; and optical means for converting deformations of the conductive/reflective layer into an image; the improvement comprising:

the electrodes of said array having at least three electrically connected fingers such that at least one of said fingers is



interleaved with fingers of an electrode in a row above in said array and at least another of said fingers is interleaved with said fingers of an electrode of a row below in said array; and

means for applying video signals to said devices.

4,879,603

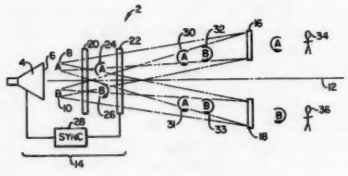
MULTIPLE IMAGE, SINGLE DISPLAY SYSTEM AND METHOD

Arthur L. Berman, Milpitas, Calif., assignor to Kaiser Aerospace & Electronics Corp., Oakland, Calif.

Filed Aug. 15, 1988, Ser. No. 232,350

Int. Cl.[4] H04N *5/445, 7/08*

U.S. Cl. 358—242 **15 Claims**



1. A multiple image, single display system comprising:

a display source providing first and second alternating visual images along a light path at a chosen rate and at first and second wavelengths;

an active polarizer assembly, synchronously coupled to the display source and positioned along the light path, which polarizes the first image with a first polarization orientation and the second image with a second polarization orientation;

a first, wavelength sensitive user polarizer positioned downstream of the polarizer assembly, associated with a first user which blocks transmission of light at about the second wavelength and the second polarization orientation: and

a second, wavelength sensitive user polarizer, positioned downstream of the polarizer assembly, associated with a second user which blocks transmission of light at about the first wavelength and the first polarization orientation;

whereby the first viewer sees the first image but not the second image and the second viewers sees the second image but not the first images without substantially affecting the non-display source vision of the users.

4,879,604

IMAGE READING APPARATUS

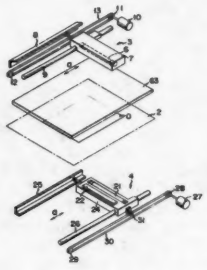
Takashi Koshiyouji, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 19, 1988, Ser. No. 221,400

Claims priority, application Japan, Jul. 22, 1987, 62-182725

Int. Cl.[4] H04N *1/04*

U.S. Cl. 358—474 **14 Claims**



1. An image reading apparatus for reading image data formed on an original, comprising:

means for placing an original having an image to be read, said original placing means being formed of a light-transmitting material;

means for pressing the original placed on said original placing means thereagainst, said original pressing means having a predetermined light reflectivity and a predetermined light transmissivity;

first light source for irradiating light to the original through said original pressing means;

second light source for irradiating light to the original through said original placing means; and

selection means for selecting one of said first and second light sources from which light is to be irradiated.

4,879,605

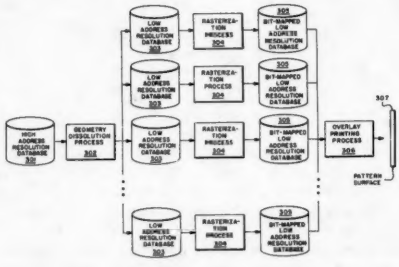
RASTERIZATION SYSTEM UTILIZING AN OVERLAY OF BIT-MAPPED LOW ADDRESS RESOLUTION DATABASES

Paul A. Warkentin, Aloha; Michael L. Rieger; Chris A. Michalski, both of Portland, and Matthew J. Jolley, Hillsboro, all of Oreg., assignors to ATEQ Corporation, Beaverton, Oreg.

Filed Feb. 29, 1988, Ser. No. 161,986

Int. Cl.[4] H04N *1/21, 1/22;* **G01D** *9/42;* **G06F** *15/40*

U.S. Cl. 358—296 **23 Claims**



1. A method for producing a high address resolution printed pattern from a high address resolution database, comprising the steps of:

producing a plurality of low address resolution databases based on said high address resolution database, said plural-

ity of low address resolution database comprising a plurality of overlay patterns corresponding to said high address resolution printed pattern;

producing a plurality of low address resolution patterns from said low address resolution databases; and

printing each of said low address resolution patterns overlayed on each other, said printing step comprising the steps of printing a first set of low address resolution patterns utilizing a first plurality of pixels; and

printing a second set of said low address resolution patterns utilizing a second plurality of pixels, said second plurality of pixels offset and centered from said first plurality of pixels.

4,879,606

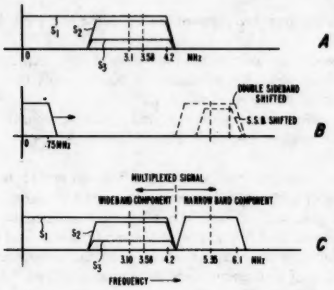
EDTV RECORDING APPARATUS

James M. Walter, Columbus; Krishnamurthy Jonnalagadda, Plainsboro, and Robert E. Flory, Princeton, all of N.J., assignors to General Electric Company, Princeton, N.J.

Filed Jun. 6, 1988, Ser. No. 205,146

Int. Cl.[4] H04N *9/79*

U.S. Cl. 358—330 **11 Claims**



1. Apparatus for recording an extended definition video signal comprising:

a source of video signal;

an extended definition television signal encoder coupled to said source and responsive to said video signal for generating a wideband video signal representing luminance and chrominance information; and generating a narrow band video signal representing differences between horizontal video signal lines which are separated in one of a spatial and temporal dimension;

modulator means for frequency shifting said narrow band signal to produce a modulated signal occupying a frequency band above the frequency band occupied by said wideband signal;

combining means, coupled to said modulator means and said encoder for combining said wideband signal and the frequency shifted narrow band signal to produce a combined signal; and

means including composite video signal recording means coupled to said combining means for recording said combined signal.

4,879,607

MAGNETIC CARD READER DEVICE

Darrell G. Redemacher, Freeville, N.Y., assignor to XCP, Inc., Dryden, N.Y.

Filed Jul. 8, 1988, Ser. No. 216,030

Int. Cl.[4] G11B *25/04*

U.S. Cl. 360—2 **14 Claims**

1. A magnetic card reader device for reading magnetically recorded data from a magnetic stripe on a card and recording data on said stripe; comprising

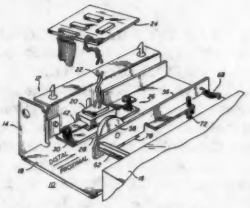
a frame;

a drive drum mounted on said frame and rotatable in a forward direction to draw said card in a distal direction and rotatable in a reverse direction to expel said card in a proximal direction, said drive drum having first and second resilient tires carried thereon at positions axially spaced on said drum;

an adjustable vertically magnetic recording/pickup head positioned opposite a card travel plane from said drive drum at the position of said first tire;

floating head support means mounting said head to said frame for permitting movement of said head towards and away from said drive drum to accommodate variations in thickness of said card, and including means permitting deflection of said head when said card is drawn in, but not when said card is expelled;

an idler pulley positioned opposite the card travel plane from said drive drum and positioned to urge said card against said second tire;



an idler arm pivotally mounted on said frame and resiliently urging said idler towards said second tire but yielding to permit said idler pulley to deflect away from the drive drum to accommodate variations in the thickness of said card; including stop means holding said idler pulley out of contact with said second tire when no card is between the idler pulley and the drive drum;

drive means for rotating said drive drum in the forward and reverse directions; and

circuit means for receiving the recorded data from said head when the card is drawn in and feeding data to the head to be recorded when the card is expelled.

4,879,608

APPARATUS FOR GENERATING INDEX SIGNALS, FOR USE IN MAGNETIC RECORDING/REPRODUCING APPARATUSES

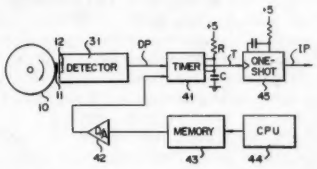
Masaki Sano, Fuji, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Division of Ser. No. 878,245, Jun. 25, 1986, Pat. No. 4,769,597. This application Jun. 23, 1988, Ser. No. 210,374

Claims priority, application Japan, Jun. 28, 1985, 60-132129; Sep. 30, 1985, 60-216426

Int. Cl.[4] G11B *5/09*

U.S. Cl. 360—51 **4 Claims**



1. An index siganl control circuit for magnetic recording medium, comprising:

sensor means for detecting a rotation of a magnetic recording medium;

pulse signal output means for outputting at least one pulse signal each time said magnetic recording medium rotates once on the basis of an output signal of said sensor means;

memory means for storing preset adjustment data, said adjustment data corresponding to a time interval after said

pulse signal output means output the pulse signal until an index pulse signal is output; and

index pulse signal output means for outputting said index pulse signal on the basis of the adjustment data stored in said memory after an expiration of a period of time corresponding to the adjustment data from the generation of the pulse signal which is output from said pulse signal output means.

4,879,609

ROTARY HEAD TYPE RECORDING APPARATUS HAVING AN ERASING FUNCTION BASED ON RECORDING MODE

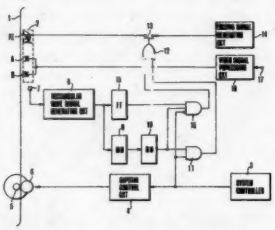
Susumu Kozuki, Tokyo; Koji Takahashi, Kanagawa; Keiji Satoh, Tokyo; Kenichi Nagasawa, Kanagawa; Hiroo Edakubo, Tokyo, and Mitsuhiro Otokawa, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 870,617, Jun. 4, 1986, abandoned. This application Nov. 23, 1988, Ser. No. 277,479

Claims priority, application Japan, Jun. 13, 1985, 60-128560

Int. Cl.[4] G11B *5/02, 15/14*

U.S. Cl. 360—66 8 Claims



1. A rotary head type recording apparatus which can record information signals on a tape-shaped magnetic recording medium based on a plurality of kinds of recording modes in which relative speeds of said tape-shaped magnetic recording medium and a recording head are different from each other, comprising:

(A) running drive means for driving a tape-shaped magnetic recording medium;

(B) a rotary type erasing head for performing erasion by tracing said tape-shaped magnetic recording medium in an oblique direction with respect to the running direction of said tape-shaped magnetic recording medium;

(C) a rotary type magnetic head for tracing said tape-shaped magnetic recording medium in the same direction as that traced by said rotary type erasing head;

(D) running speed changeover means for controlling said running drive means depending on the kinds of said recording modes and changing over the running speed of said tape-shaped magnetic recording medium;

(E) signal-for-erasion generating means for intermittently generating a signal for erasion and supplying said signal for erasion to said rotary type erasing head; and

(F) control means for varying an output cycle of said signal for erasion generated by said signal-for-erasion generating means, depending upon said kinds of said recording modes.

4,879,610

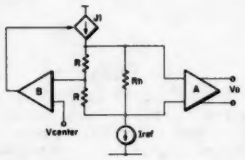
PROTECTIVE CIRCUIT FOR A MAGNETORESISTIVE ELEMENT

Stephen A. Jove, Watsonville; Klaas B. Klaassen; Calvin S. Nomura, both of San Jose, and Jacobus C. L. vanPeppen, San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 28, 1988, Ser. No. 250,784

Int. Cl.[4] G11B *5/02, 5/127*

U.S. Cl. 360—67 25 Claims



1. A protection circuit for a magnetoresistive element comprising;

a magnetoresistive element having a first and a second terminal;

a first current source coupled to said first terminal of said MR element for producing a bias current through said magnetoresistive element;

a second current source coupled to said second terminal of said magnetoresistive element to produce a reference current;

circuit means coupled across said first and said second terminals of said magnetoresistive element for sensing the center potential of said MR element substantially midway between said first and said second terminal; and

feedback circuit means responsive to the sensed center potential of said magnetoresistive element to adjust the current output of said first current source to maintain said center potential to a predetermined reference voltage.

4,879,611

RECORD MODE SETTING APPARATUS RESPONSIVE TO TRANSMITTED CODE CONTAINING TIME-START INFORMATION

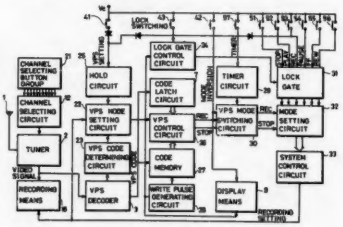
Kumiko Fukui, Shijonawate; Tatsuaki Doumura, Higashiosaka, and Shigeo Okamoto, Ikoma, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Jul. 30, 1987, Ser. No. 79,745

Claims priority, application Japan, Aug. 1, 1986, 61-182513; Aug. 20, 1986, 61-194517

Int. Cl.[4] G11B *15/18, 5/02*

U.S. Cl. 360—69 5 Claims



1. A record mode setting apparatus for use in a video tape recorder, said video tape recorder including a tuner for detecting from a broadcasting signal a video signal which may include a VPS code indicating at least scheduled starting time of

a program, recording means for recording the video signal detected by said tuner, and recording switch means for setting said recording means to be ready for operating, said record mode setting apparatus comprising:

VPS code deriving means for deriving the VPS code from a video signal detected by said tuner;

VPS setting switch means for setting a recording based on a VPS;

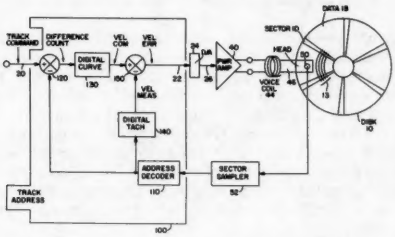
storing means responsive to operation of said VPS setting switch means for storing the VPS code derived from said VPS code deriving means; and

VPS control means for comparing the VPS code derived from said VPS code deriving means with an output from said storing means and being responsive to the result of the comparison for generating a control signal for controlling operation of said recording means which is ready for operating by operation of said record switch.

4,879,612
HEAD POSITIONING SERVO-MECHANISM WITH ERROR REDUCTION CAPABILITIES

Robin J. Freeze, Milpitas, and John L. Grimsley, Los Altos, both of Calif., assignors to Data Technology Corporation, Santa Clara, Calif.

Filed Nov. 26, 1986, Ser. No. 935,687
Int. Cl.[4] G11B *21/08, 21/10*
U.S. Cl. 360—78.06 **23 Claims**



1. A velocity servo system for a disk drive, said servo system being responsive to digital signals and generating a control signal for moving a read head of the disk drive from a current track position to a commanded track position, said servo system comprising:

(a) means for reading current track address information and servo bursts recorded on a disk in said disk drive and for generating threshold signals when said read servo bursts are of a predetermined amplitude;

(b) an appropriately programmed data processing system providing:

(1) decoding means responsive to the current track address read by the reading means and to the threshold signals for generating a current half track address;

(2) first comparator means for comparing the current half track address with the commanded track position to generate half tracks-to-go digital data in response thereto;

(3) means for generating commanded acceleration data in response to the half tracks-to-go data and to successive half track addresses;

(4) means responsive to the current half track address for predicting the half track address the read head will be positioned over when said reading means is next able to read track address data;

(5) means for comparing the current half track address data with predicated half track address data; and

(6) means for substituting the current half track address data with the predicated half track address data when the difference between the predicted half track address data and the decoded half track address data exceeds a predetermined amount; and

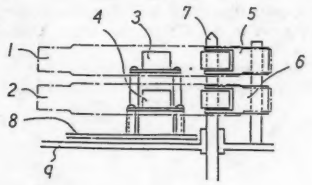
(7) means responsive to said half tracks-to-go digital data for adjusting said predetermined amount as a function of the value of said half tracks-to-go digital data; said servo system further including:

(c) digital to analog converter for converting said commanded acceleration data to said control signal.

4,879,613
CASSETTE TAPE RECORDER FOR MULTIPLE CASSETTE TAPES

Satoru Koizumi; Daisuke Teshima, and Yoshio Katayama, all of HigashiHiroshima, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 852,625, Apr. 16, 1986, abandoned.
This application Aug. 1, 1988, Ser. No. 227,480
Claims priority, application Japan, Apr. 17, 1985, 60-81897; May 20, 1985, 60-109953; May 20, 1985, 60-109954; May 20, 1985, 60-109955
The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.
Int. Cl.[4] G11B *15/68*
U.S. Cl. 360—92 **10 Claims**



1. A tape recorder comprising:

a cassette tape compartment in which a plurality of cassette tapes are detachably loaded,

a capstan on which said plurality of cassette tapes housed in said cassette tape compartment are coaxially mounted,

a separate roller means for driving each of said plurality of cassette tapes, each of said roller means being mounted so that it can be pressed against said capstan,

a single control means for selecting any of said plurality of tapes to be driven by said roller means, said single control means being a selector button,

means commonly used for all cassette tapes for selecting one of a plurality of cassette tape drive modes;

means including said roller means for driving any selected cassette tape in said selected one of said drive modes,

a playback and/or recording head provided for each of the plurality of cassette tapes; and

means for electrically operating said playback and/or recording head provided for each of the cassette tapes, for playback or recording on at least one of said plurality of cassette tapes.

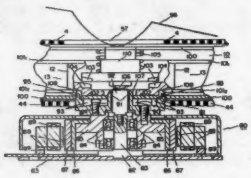
4,879,614
APPARATUS FOR DRIVING A REEL IN A TAPE CARTRIDGE FOR A MAGNETIC INSTRUMENT

Fuyuki Nakagome, Kodaira, Japan, assignor to Nakamichi Corporation, Kodaira, Japan

Filed May 25, 1988, Ser. No. 198,766
Claims priority, application Japan, May 27, 1987, 62-80126[U]
Int. Cl.[4] G11B *15/67, 15/26, 23/027*
U.S. Cl. 360—93 **3 Claims**

1. An apparatus for driving a reel in a tape cartridge including reel locking means having a non-rotary forced member disposed at a center of said reel in said tape cartridge for a magnetic instrument, said apparatus comprising;

reel drive means to engage said reel to rotatively drive said reel;



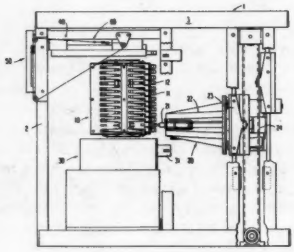
and non-rotary unlocking means disposed at a central axis of said reel drive means to force said non-rotary forced member so as to displace said reel locking means whereby said reel is unlocked.

4,879,615

CARTRIDGE TRANSFER MECHANISM FOR A DISK FILE APPARATUS

Shunichi Teranishi, Anjo, and Takeshi Hayashi, Kariya, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Dec. 24, 1987, Ser. No. 137,704
Claims priority, application Japan, Dec. 26, 1986, 61-314348
Int. Cl.[4] G11B *17/12, 17/22*
U.S. Cl. 369—34 **3 Claims**



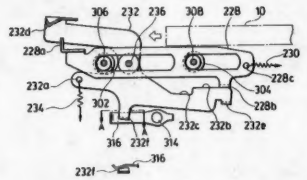
1. In a disk file apparatus comprising an accommodating shelf having a multiplicity of accommodating spaces provided therein in a vertical row for receiving a multiplicity of cartridges in said accommodating spaces, respectively, with each cartridge having a disk received therein, coding means for transferring information to or from either side of the disk receivied in each of said cartridges and carrier means arranged to move vertically along the front surface of said accommodating shelf, draw out a selected one of said cartridges and load said cartridge into said coding means with the proper orientation, wherein the improvement comprises a transfer mechanism disposed in said apparatus above said accommodating shelf for access by said carrier means, said apparatus having a feed and discharge port adjacent said transfer mechanism through which cartridges may be inserted into said transfer mechanism from the outside of said apparatus and removed from said transfer mechanism to the outside of said apparatus, said transfer mechanism mechanism comprising a rotatable mechanism having cartridge receiving means adapted to be positioned adjacent said feed and discharge port in a first position of said rotatable mechanism and disposed adjacent said carrier means in a second position of said rotatable mechanism and means for rotating said rotatable mechanism between said firsts and second positions.

4,879,616

MAGNETIC DISC PACK LOADING MECHANISM

Shigeru Ando, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 4, 1987, Ser. No. 129,115
Claims priority, application Japan, Dec. 4, 1986, 61-289820; Dec. 15, 1986, 61-298412
Int. Cl.[4] G11B *17/04*
U.S. Cl. 360—99.06 **4 Claims**



1. A magnetic disc pack loading mechanism for positioning a magnetic disc pack in a recording or reproducing position by moving a pack holder containing said magnetic disc pack therein in the same direction with the direction to insert said magnetic disc pack into said pack holder and thereafter moving said pack holder in the longitudinal direction of a rotary drive shaft perpendicular to said magnetic disc pack insertion direction, said magnetic disc pack loading mechanism comprising:

a pop-up member disposed in said pack holder in a manner to be free to advance or retreat and provided in a tip of said pop-up member with an engagement portion located in an area for insertion of said magnetic disc pack within said pack holder, said pop-up member being adapted to advance against the energization force of a spring acting in the discharge direction f said magnetic disc pack with said engagement portion thereof engaged with the leading end of said magnetic disc pack when said magnetic disc pack is inserted into said pack holder with a given pushing force;

a pre-lock lever disposed rotatably in said pack holder and provided in the tip of said pop-up member with an engagement portion being energized by a spring in a direction for engagement with said magnetic disc pack, said pre-lock lever being adapted to be able to provisionally lock said magnetic disc pack within said pack holder with said engagement portion thereof engaged with said magnetic disc pack when said pre-lock lever is rotated a given amount; and,

a cam mechanism including a cam portion provided in one of said pop-up member and said pre-lock lever and a cam follower portion in the other, said cam mechanism being adapted to prevent said pre-lock lever against rotation before said pop-up member advances a given distance and to allow said pre-lock lever to rotate in said engagement direction after said pop-up member advances said given distance.

4,879,617

ACTUATOR ASSEMBLY FOR HARD DISK DRIVES

Joseph M. Sampietro, Tarzana, and Khosrow Mohajerani, Newbury Park, both of Calif., assignors to Rigidyne Corporation, Simi Valley, Calif.

Filed Mar. 25, 1988, Ser. No. 173,618
Int. Cl.[4] G11B *5/55*
U.S. Cl. 360—106 **23 Claims**

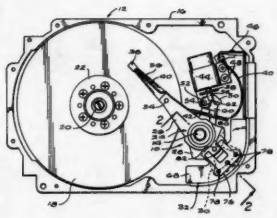
1. A process for assembling a coil assembly to a pivotable actuator for use in a disk drive system, the steps comprising:

providing an actuator having an arm assembly and a counterbalance, the counterbalance including a recess situated generally opposite the arm assembly with respect to a pivot axis of the actuator, the counterbalance recess in-

cluding a dovetail receiving portion having at least two precision positioning surfaces;

providing a coil assembly having a bobbin, the bobbin including a base, a core which extends from the base, and a dovetail extending from the base opposite the core, the dovetail being dimensioned to fit within the receiving portion of the counterbalance recess and including at least two precision positioning surfaces;

sliding the base and dovetail of the bobbin into the counterbalance recess;



applying a directional force to the coil assembly to cause the precision positioning surfaces of the bobbin dovetail to engage the corresponding precision positioning surfaces of the counterbalance recess; and

fixing the coil assembly to the actuator with the precision positioning surfaces engaged, so that upon removal of the directional force applied to the coil assembly, the precision positioning surfaces remain engaged.

4,879,618

WIND BREAKING ASSEMBLY FOR A MAGNETIC HEAD

Muneo Iida; Masanobu Honda; Katsumi Kawamura; Hiroshi Daito; Yoshihiko Miyake, all of Odawara; Shouichi Setone, Ebina; Hatsuo Takahashi, Chigasaki, and Michihiro Nakanishi, Odawara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

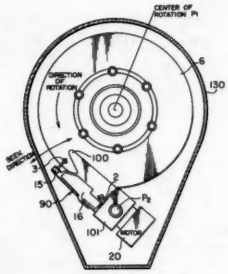
Continuation of Ser. No. 943,909, Dec. 19, 1986, abandoned.

This application Sep. 23, 1988, Ser. No. 248,377

Claims priority, application Japan, Dec. 23, 1985, 60-287707

Int. Cl.[4] G11B *5/55*

U.S. Cl. 360—106 **12 Claims**



1. An actuator for a magnetic disk device comprising: a plurality of magnetic disks

a plurality of riged head arms having a predetermined length between two ends, one end of each being fixed to a carriage;

a plurality of resilient gimbals each having one end fixed to the other end of a corresponding head arm; a plurlityof magnetic heads, each supported on another end of said respective gimbal;

a drive source for driving said carriage so that the magnetic heads are moved in a radial direction of said magnetic disks;

each of said head arms comprising first and second branching portions;

said first and second branching portions being unitary parts of a plate-shaped member having a surface which is parallel to the surfaces of the magnetic disks;

said first branching portion supporting one or said plurality of magnetic heads through one of said gimbals so as to position said magnetic head above a recording surface of a magnetic diskf and

said second branching portion extending toward the axis of rotation of said magnetic disks to a position that is radially inside of the position of said first branching portion above the recording surface of said magnetic disk and disposed on a windward side of the magnetic head supported by said first portion.

4,879,619

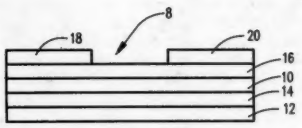
MAGNETORESISTIVE READ TRANSDUCER

Robert E. Fontana, Jr., San Jose; James K. Howard, Morgan Hill; James H. Lee, and Haralambos Lefakis, both of San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 28, 1988, Ser. No. 173,956

Int. Cl.[4] G11B *5/39*

U.S. Cl. 360—113 **4 Claims**



1. A magnetoresistive read transducer comprising:

a thin film of magnetoresistive conductive layer formed of ferromagnetic material;

a thin film spacer layer in contact with said magnetoresistive layer, said thin film spacer layer comprising a material selected from the group consisting of nichrome and nichrome with chromium oxide; and

a thin film of soft magnetic material in contact with said thin film spacer layer so that said thin film of soft magnetic material is positioned parallel to but spaced from said magnetoresistive layer whereby a transverse bias can be produced in at least a part of said magnetoresistive layer to maintain said transverse biased part of said magnetoresistive layer in a linear response mode.

4,879,620

MAGNETIC HEAD FOR FLEXIBLE DISK DRIVE

Akihiko Yamashita, Koide, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Jan. 28, 1988, Ser. No. 149,634

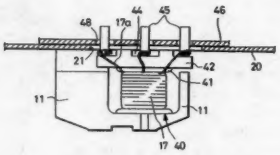
Claims priority, application Japan, May 26, 1987, 62-79598[U]

Int. Cl.[4] G11B *5/20, 5/27*

U.S. Cl. 360—123 **5 Claims**

1. A magnetic head for a flexible disk which includes a slider, a magnetic core securely mounted on said slider, a coil bobbin mounted on said magnetic core and having a coil wound thereon, and a support plate for supporting said slider thereon, and wherein lead wires of said coil are lead out to a location on or above an upper face of said support plate, comprising a flange of said coil bobbin which is located at an end

of said coil bobbin adjacent said support plate, and a number of terminals corresponding to said lead wires of said coil provided uprightly on said flange and having ends of the corresponding lead wires secured thereto, said terminals extending upwardly



through and above said upper face of said support plate; wherein said flange includes projections defining one recess for each terminal, a base portion of each terminal being located in said one recess.

4,879,621

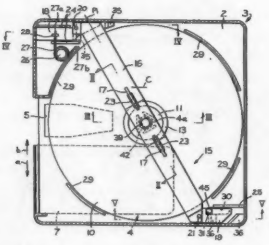
DISK RESTRAINT

Davis W. Chamberlin, St. Paul; Vurnen J. Leonard, Minneapolis, both of Minn., and Osamu Koizumi, Sendai, Japan, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn. and Sony Corporation, Tokyo, Japan

Filed Jul. 11, 1988, Ser. No. 217,439

Int. Cl.[4] G11B *23/03*

U.S. Cl. 360—133 **13 Claims**



1. A cartridge for a disc having at least one magnetic surface comprising:

a top wall generally parallel to the plane of said disc;

a bottom wall generally parallel to said top wall and said plane of said disc;

side walls connecting said top and said bottom walls to form an enclosure surrounding said disc;

a camming surface extending from the surface of said top wall facing said disc toward said disc; and

a resilient restraint spanning said disc and supported beyond the extent of said disc and slideable within said cartridge between a first position wherein a portion of said restraint engages said camming surface to be forced toward said disc and capture said disc between said restraint and said bottom wall and a second position wherein said restraint is free of contact with said camming surface and resiliently retracts out of contact with said disc.

4,879,622

CIRCUIT FOR MONITORING A SUPERCONDUCTING MAGNET WINDING

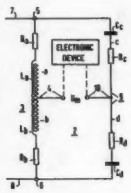
Lutz Intichar, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 716,018, Mar. 26, 1985, abandoned. This application May 20, 1987, Ser. No. 52,656

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1984, 3413127

Int. Cl.[4] H02H *7/00*

U.S. Cl. 361—19 **3 Claims**



1. An improvement to a quench detection circuit which is connected to a superconducting magnet and which includes an electronic device,

the magnet being of a type which includes two series-connected sub-windings connected together at an intermediate tap point,

the circuit being connected across the magnet and to the sub-windings and including two series-connected sub-branches connected together at a junction point, each of the sub-branches including a resistor and the sub-branches being connected in a manner that the tap and junction points form diagonal points of a bridge circuit,

and said electronic device being connected to said diagonal points,

the improvement comprising two capacitors, each connected in a corresponding one of the sub-branches.

4,879,623

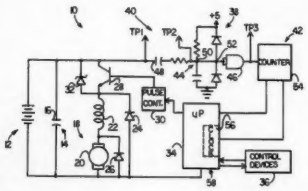
VOLTAGE TRANSIENTS

Kenneth A. Baumgartner, Peoria, Ill., and William Pickering, University Heights, Ohio, assignors to Caterpillar Industrial Inc., Mentor, Ohio

Filed Dec. 2, 1985, Ser. No. 803,285

Int. Cl.[4] H02H *7/09*

U.S. Cl. 361—33 **14 Claims**



1. Apparatus which protects an electrical circuit from damage caused by variations in the nominal voltage level of electrical power supplied to the electrical circuit, the electrical circuit including a motor circuit, comprising:

power supply means for supplying direct current to said motor circuit, said direct current having a nominal direct

current voltage value and as associated transient voltage component;

smoothing means for limiting the amplitude of said transient voltage component to a predetermined maximum value relative to said nominal direct current voltage value;

a motor connected across said power supply means;

pulse control means for delivering time modulated current pulses from said power supply means to said motor;

sensing means for controllably producing a fault signal in response to the amplitude and frequency of occurrence of said transient voltage component exceeding predetermined maximum values; and

override means for receiving said fault signal and responsively modifying said time modulated current pulses delivered from said pulse control means.

4,879,624

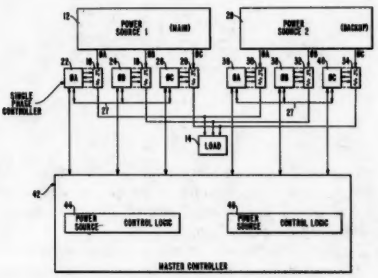
POWER CONTROLLER

Gregory D. Jones; William R. Owens, both of Rockford; Clifford G. Thiel, Stillman Valley, and Clive M. Danby, Rockford, all of Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 24, 1987, Ser. No. 137,582

Int. Cl.[4] H02J 3/00

U.S. Cl. 361—65 **17 Claims**



9. A power supply of an electrical load comprising:

(a) a first power source having at least two phases, each power source phase having

(i) an associated first power source phase switching means disposed between the first power source phase and the electrical load, each first power source phase switching means having a first conductivity permitting current flow between the associated first power source phase and the electrical load in response to either the absence of a fault condition in the first power source phase or in response to a second power source trip signal and a second conductivity blocking current flow between the first power source phase and the electrical load in response to a first power source phase trip signal, and

(ii) a first power source phase controller controlling the conductivity of the associated first power source switch, detecting the presence of a fault condition, and generating the first power source phase trip signal in response to detection of a fault condition in the first power source phase.

(b) a second power source having an identical number of phases as the first power source, each second power source phase having

(i) an associated second power source switching means disposed between the second power source phase and the electrical load, each second power source switching means having a first conductivity permitting current to flow between the second power source phase and the electrical load and a second conductivity blocking current flow between the second power source phase and the electrical load, each second power source phase not being connected to the electrical load during operation of the first power source when the first power source trip signal has not been generated by at least one of the phases of the first power source, and

(ii) a second power source phase controller controlling the conductivity of the associated power source phase and detecting a fault condition in an associated phase of the second power source and generating a fault signal in response to the detection of the fault condition;

(c) a master controller, responsive to each of the phase controllers of the first and second power sources and the generation of a first power source trip signal by at least one of the phases of the first power source and the absence of the second power source trip signal to cause the phases of the first power source to be disconnected from the electrical load by changing the conductivity of the associated first power source switching means to the second conductivity and to cause the phases of the second power source to be connected to the electrical load upon the detection of zero voltage in each of the second power source phases by changing the conductivity of the associated second power source switching means to the first conductivity and generating the second power trip signal in response to a fault signal generated by at least one of the phase controllers of the second power source.

4,879,625

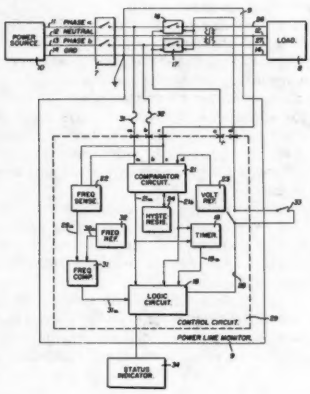
VOLTAGE MONITOR

Richard A. Potenzone, 20675 SW. 162 Ave., Miami, Fla. 33187

Filed Dec. 11, 1987, Ser. No. 131,852

Int. Cl.[4] H01H 5/20

U.S. Cl. 361—90 **18 Claims**



1. Voltage monitor for monitoring the output voltage of a power source being connectable to a load through at least two phase leads and a neutral lead, comprising: a reference voltage source, comparator means for comparing the output voltage with said reference voltage for producing an affirmative output if said output voltage is within a given range of said reference voltage, and switch means including a switch in each of said phase leads being responsive to said affirmative output for connecting said load to said power source.

4,879,626

OVERLOAD RELAY WITH ADJUSTABLE THRESHOLD INDICATOR

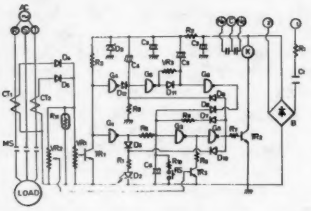
In S. Kim, Samig Apt. 10-dong 615, 134-21, Cheongdam-dong, Kangnam-ku, Seoul, Rep. of Korea

Continuation of Ser. No. 157,139, Feb. 10, 1988, abandoned, which is a continuation of Ser. No. 770,094, Aug. 28, 1985, abandoned. This application Oct. 7, 1988, Ser. No. 256,138

Claims priority, application Rep. of Korea, Sep. 1, 1984, 84-5375; May 2, 1985, 85-2996; May 2, 1985, 85-2997

Int. Cl.[4] H02H *3/093*

U.S. Cl. 361—93 2 Claims



1. An overload relay circuit for a single phase or a three phase alternating current, said overload relay circuit receiving a constant DC voltage from a power supply circuit having two DC terminals and comprising:

a relay connected between said DC terminals of said power supply circuit;

a current transformer having a secondary coil with an output terminal, said current transformer detecting an overload current signal of said single phase or three phase alternating current drawn by a load;

rectification means for rectifying said overload current signal detected by said current transformer;

means for amplifying said rectified overload current signal;

temperature compensation means adjacent said secondary coil of said current transformer for detecting temperature changes and compensating for errors caused by detected temperature changes;

overload display means responsive to said rectified overload current signal and being energized to display an overload current condition of said load, said overload current condition occurring when the current drawn by said load exceeds an overload current set point;

means for adjusting said overload current set point while said overload display means and load are energized to a new overload current set point exceeding the current drawn by said load so as to extinguish said overload display means;

overload relay operating means responsive to said rectified overload current signal for energizing said relay upon detection of said overload current signal, the energization of said relay eliminating the overload current condition of said load; and

relay operation delay means responsive to said rectified overload current signal for delaying the operation of said overload relay operating means a predetermined amount of time after energizing of said overload display means.

4,879,627

DIFFERENTIAL CAPACITIVE PRESSURE SENSOR WITH OVER-PRESSURE PROTECTION

Daniel H. Grantham, Glastonbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 30, 1988, Ser. No. 292,281

Int. Cl.[4] G01L *9/12*

U.S. Cl. 361—283 14 Claims

1. A differential capacitive pressure sensor of the silicon-on-silicon type having over-pressure protection, comprising:

a first conductive silicon base having a pressure port through it to an exterior area whose pressure variation is to be sensed;

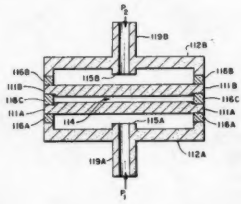
a first conductive silicon flexible, elastic diaphragm having an exterior side exposed to said pressure port of said first base, said diaphragm being capable of flexing movement due to changes in pressure on its exterior side; and

a first non-conductive spacing wall between said first silicon base and said first silicon diaphragm, said first spacing wall providing a peripheral wall extending between and joining said first silicon base and said first silicon diaphragm;

a second conductive silicon base having a pressure port through it to an exterior area whose pressure variation is to be sensed;

a second conductive silicon flexible, elastic diaphragm having an exterior side exposed to said pressure port of said second base, said diaphragm being capable of flexing movement due to changes in pressure on its exterior side; and

a second non-conductive spacing wall between said second



silicon base and said second silicon diaphragm, said second spacing wall providing a peripheral wall extending between and joining said second silicon base and said second silicon diaphragm; and

a centrally located, third, non-conductive spacing wall located between said first and said second diaphragms joining them together in spaced, parallel, juxtaposed relationship; said third spacing wall and said first and second diaphragms forming an evacuated, reference cavity chamber between them; each said diaphragm backing the other said diaphragm up; the flexing movement of each of said silicon diaphragm due to the changes in pressure on its exterior side through its respective pressure port causing the capacitance of the sensor to vary; the spacing between said two diaphragms being small, the backing presence of one diaphragm to the other diaphragm limiting the amount of deflection of said one diaphragm, lending extra stiffness and resistance to further flexing to said one diaphragm when they come into contact, said other diaphragm thereby providing said one diaphragm with over-pressure protection.

4,879,628

HIGH VOLTAGE MEASUREMENT CAPACITOR

Bernhard Goetz, 55 W. 14th St., New York, N.Y. 10011

Filed Oct. 18, 1988, Ser. No. 259,247

Int. Cl.[4] H01G *4/04*

U.S. Cl. 361—327 9 Claims

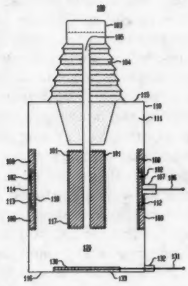
1. A capacitor for use with a high voltage line, the capacitor including:

a hollow cylindrical housing with the axial direction of the housing having a horizontal orientation, the housing defining a cavity and including a vertical protrusion in the circular wall of the cylinder defining a reservoir;

a cylindrical high voltage (HV) electrode aligned axially with the housing and disposed proximate to the center line of the cavity;

first and second HV bushings attached to the opposing transverse ends of the housing;

first and second HV leads introduced into the cavity via the first and second HV bushings and wherein the internal end of each of the HV leads couples to the HV electrodes at its opposing transverse ends and the external end of each of the HV leads forms first and second HV terminals accessible for series insertion into the high voltage line;



a cylindrical low voltage (LV) electrode arranged in coaxial relation between the housing and the HV electrodes;

a LV bushing attached to the circular wall of the housing;

a LV lead introduced into the cavity via the LV bushing and wherein the internal end of the LV lead couples to the LV electrode and the external end of the LV lead forms a LV terminal; and

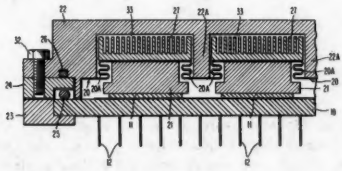
a non-gaseous dielectric material filling the cavity and a portion of the reservoir.

4,879,629

LIQUID COOLED MULTI-CHIP INTEGRATED CIRCUIT MODULE INCORPORATING A SEAMLESS COMPLIANT MEMBER FOR LEAKPROOF OPERATION

Jerry I. Tustaniwskyj, Mission Viejo, and Kyle G. Halkola, San Diego, both of Calif., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Oct. 31, 1988, Ser. No. 264,749
Int. Cl.[4] H01L *23/36, 23/40*
U.S. Cl. 361—385 **8 Claims**



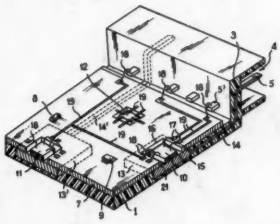
1. A liquid cooled integrated circuit module that includes a substrate having a major surface, a plurality of integrated circuit chips which are spaced apart on said substrate surface in a non-coplanar fashion, a single seamless compliant member that covers all of said chips and is attached to said substrate, thermally conductive studs which lie between said seamless member and said chips and which conduct heat therebetween, and a rigid cover over said seamless compliant member which forms channels for a liquid coolant and which attaches to said substrate such that said compliant member and said studs and said chips are squeezed together; wherein to compensate for said non-coplanarity and accommodate a small spacing between chips, said seamless compliant member has pleated regions with each such region having pleats which run zigzagged alongside of said studs perpendicular to said substrate surface.

4,879,630

HOUSING FOR AN ELECTRONIC CIRCUIT

Michel Boucard, Tournefeuille; Christian Thirion, Auterive, and Christian Maurel, Toulouse, all of France, assignors to Bendix Electronics S.A., Toulouse, France

Filed Sep. 1, 1988, Ser. No. 239,718
Claims priority, application France, Sep. 3, 1987, 87 12241
Int. Cl.[4] H05K *7/20*
U.S. Cl. 361—386 **9 Claims**



1. A housing for an electronic circuit comprising:

at least one electronic power component;

at least one radiator means embedded in the housing and having one surface in thermal and electrical contact with an electrode of said component, said one surface being flush with an internal surface of the housing; and

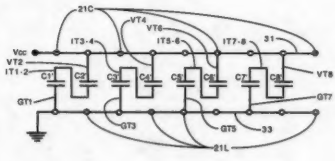
an electrical connecting pin integral with said radiator means, said pin embedded in the housing, said pin extending from the housing for forming an external connection.

4,879,631

SHORT-RESISTANT DECOUPLING CAPACITOR SYSTEM FOR SEMICONDUCTOR CIRCUITS

Gary M. Johnson, and Leland R. Nevill, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Jan. 18, 1989, Ser. No. 298,736
Int. Cl.[4] H05K *7/20*
U.S. Cl. 361—386 **15 Claims**



9. In combination with a circuit-board-mounted array of row-and-column-addressable digital logic components, a decoupling capacitor system between a Vcc bus and a Vss bus comprising two or more series-connected capacitors.

4,879,632

COOLING SYSTEM FOR AN ELECTRONIC CIRCUIT DEVICE

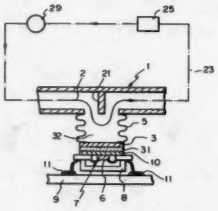
Haruhiko Yamamoto, Yokohama; Masahiro Suzuki, Inagi; Yoshiaki Udagawa, Tokyo; Mitsuhiko Nakata, Kawasaki; Koji Katsuyama, Yokohama; Izumi Ono, Hachioji, and Shunichi Kikuchi, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Oct. 3, 1986, Ser. No. 914,942

Claims priority, application Japan, Oct. 4, 1985, 60-221209; Oct. 4, 1985, 60-152137; Nov. 19, 1985, 60-259384; Dec. 3, 1985, 60-273068; Dec. 3, 1985, 60-273069; Dec. 3, 1985, 60-273070; Dec. 3, 1985, 60-273071; Dec. 3, 1985, 60-273072; Dec. 3, 1985, 60-273073; Jan. 28, 1986, 61-017031

Int. Cl.[4] H05K 7/20

U.S. Cl. 361—386 36 Claims



1. In an electronic circuit device comprising a printed circuit board supporting thereon at least one electronic circuit component connected thereto by first solder means, a cooling system for the component including a cooling module which comprises a conduit for coolant flow, a first heat transfer plate directly exposed to the flow of the coolant for transferring the heat dissipated from the circuit component to the coolant, second solder means between the heat transfer plate and the circuit component for establishing a compliant contact between the first heat transfer plate and the circuit component through the second solder means, and elastic means connected to the first heat transfer plate for resiliently biasing the first heat transfer plate toward the circuit component, said second solder means having a melting point which is lower than that of the first solder means so as to ensure that the second solder means melts at a temperature where the first solder means remains solid.

4,879,633

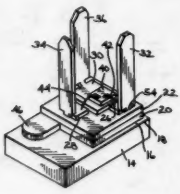
DIRECT BOND CIRCUIT ASSEMBLY WITH GROUND PLANE

Lance R. Kaufman, 131 N. White Oak Way, Mequon, Wis. 53092

Filed Apr. 12, 1988, Ser. No. 180,474

Int. Cl.[4] H05K 7/20

U.S. Cl. 361—386 6 Claims



1. An electric circuit assembly comprising:

an electrically insulating thermally conductive base substrate;

an electrically conductive metallic ground plane on said base substrate;

an electrically insulating thermally conductive intermediate substrate on said ground plane;

said base substrate extending laterally beyond said ground plane and said intermediate substrate;

an electrically conductive metallic lead frame having a pad portion on said intermediate substrate and having an extension portion extending laterally beyond said ground plane and said intermediate substrate;

said ground plane being directly bonded to said base substrate, said intermediate substrate being directly bonded to said ground plane, said lead frame pad portion being directly bonded to said intermediate substrate, all by heating said base substrate, said ground plane, said intermediate substrate and said lead frame to a temperature below the melting point of said ground plane and said lead frame to form a eutectic with said ground plane and said lead frame which wets said base substrate, said ground plane, said intermediate substrate and said lead frame, and cooling said base substrate, said ground plane, said intermediate substrate and said lead frame, with said ground plane bonded to said base substrate therebelow and said intermediate substrate thereabove, and said lead frame pad portion bonded to said intermediate substrate therebelow.

4,879,634

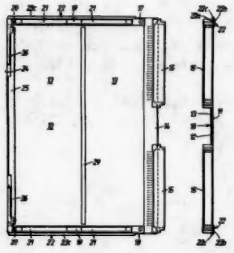
RACK MOUNTED CIRCUIT BOARD

Alan J. Storrow, and Nigel J. Knighton, both of Northampton, England, assignors to Plessey Overseas Limited, Ilford, England

Filed Nov. 13, 1987, Ser. No. 121,023

Int. Cl.[4] H05K 7/20

U.S. Cl. 361—388 7 Claims



1. A rack-mountable circuit board of substantially rectangular shape comprising a substrate having a first surface whereon a printed circuit is provided, a second surface having a thermally conductive heat management layer bonded thereto, said second surface supporting components in thermal contact with said heat management layer, said board having two opposite edges, a guide mounted at each of said opposite edges, said guides providing first portions in thermal contact with said heat management layer, second portions presenting conduction surfaces at said second surface of the substrate, and third portions, in the plane of said substrate, presenting clear margins enabling the board to be inserted, in use, in a convection cooled box, and connectors mounted on and projecting from said second surface adjacent but inwardly of said third portions of said edge guides, the board further including board clamping means mounted longitudinally of said first portions of said edge guides, in opposition to said second portions, and serving upon actuation to urge said second portions into thermal

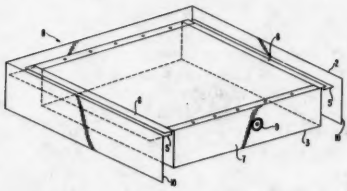
contact with cold surfaces of a conduction cooled box when the board is mounted therein.

4,879,635

MOUNTING CHASSIS FOR A GRAPHICS FUNCTION CONTROL UNIT

Robert T. Collins, Bedford, Mass.; John D. Quinn, Hudson, N.H., and Stephen A. Fidrych, Boxboro, Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Aug. 7, 1987, Ser. No. 83,655
Int. Cl.[4] H05K *7/14*
U.S. Cl. 361—391 **3 Claims**



1. A mounting for electronic components of a function control unit of a pedestal-type work station, comprising:

a self-contained electronics chassis holding the electronic components of the function control unit, the electronics chassis having a rear side and at least one connector on the rear side connecting the electronics chassis to portions of the pedestal-type workstation said chassis rear side being the only side having an electrical connector mounted thereon;

a housing enclosing the electronics chassis, the housing also comprising a part of the pedestal-type workstation, the housing having a closed front, and an open rear side receiving the electronic chassis and an inside the housing having no electrical connector mounted thereon;

a high resolution color graphics display terminal supported by the housing, the display terminal comprising part of the pedestal-type workstation; and

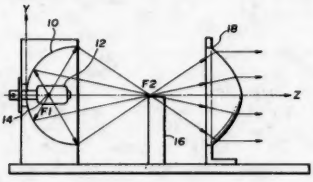
means for removably mounting the electronics chassis inside the housing, the electronics chassis being electronically insulated from the inside of the housing.

4,879,636

PROJECTOR-TYPE HEAD LAMP FOR VEHICLES

Hirofumi Yamagishi, Isehara; Tooru Segoshi, Yokohama; Kouji Shigemura; Yutaka Nakata, both of Isehara; Hirokazu Yoneyama, Hiratsuka, and Mototsugu Yamashita, deceased, late of Atsugi, all of Japan (by Takemi Yamashita, heir), assignors to Nissan Motor Company, Yokohama and Ichikoh Industries, Tokyo, both of, Japan

Filed Jun. 17, 1988, Ser. No. 207,815
Claims priority, application Japan, Jun. 17, 1987, 62-149236
Int. Cl.[4] B60Q *1/04*
U.S. Cl. 362—61 **4 Claims**



1. A projector-type head lamp for vehicles, comprising:

a reflector having an inside reflector surface of a predetermined geometrical shape and provided with a light source at one of the foci thereof;

a shade disposed near the other focus of said reflector and which is intended to shape the light beam reflected at said inside reflective surface; and

a lens means of converging the light beam shaped by said shade and having a focal plane near the other focus of said reflector;

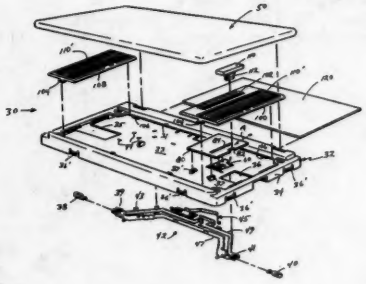
said light source being a discharge lamp having a single temperature with a spatially continuous brightness distribution.

4,879,637

LIGHT CONTROL CIRCUIT FOR VANITY MIRROR ASSEMBLY

Russell L. Clark, Zeeland; Kim L. Van Order, Hamilton; Michael J. Suman, and Todd A. Zandbergen, both of Holland, all of Mich., assignors to Prince Corporation, Holland, Mich.

Filed Nov. 4, 1988, Ser. No. 267,178
Int. Cl.[4] F21V *33/00*
U.S. Cl. 362—141 **17 Claims**



1. An illuminated vanity mirror assembly including a variable resistance circuit for providing a dimming control comprising:

an electrical circuit board having a resistance material extending along a predetermined length of one side of said board;

electrical contact means for selectively engaging said resistance material;

means for mounting said circuit board and said contact means for movement relative to each other to provide a variable resistance to said contact means; and

means for electrically coupling said contact means to lamp means associated with the vanity mirror for selectively varying the intensity of light from said lamp means.

4,879,638

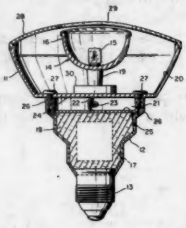
SPOTLIGHT ARRANGEMENT

Ernest J. Pavelin, Harlow, England, assignor to Thorn EMI plc, London, England

Continuation of Ser. No. 94,995, Sep. 10, 1987, Pat. No. 4,829,412. This application Mar. 6, 1989, Ser. No. 318,906
Claims priority, application United Kingdom, Sep. 10, 1987, 8621848
Int. Cl.[4] F21V *13/04*
U.S. Cl. 362—294 **1 Claim**

1. A spotlight comprising an enclosure having a light-reflective, interior surface; a light transmissive cover for said enclosure, the cover having a central opening; and light source means comprising a mirror reflector and a lamp within the

reflector, the light source means being mounted within the enclosure directly behind the central opening for passing light



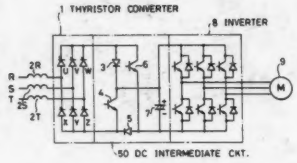
from the light source means into the enslosure behind the cover and thereby illuminating the cover from behind.

4,879,639

POWER CONVERTER FOR DRIVING AN AC MOTOR AT A VARIABLE SPEED

Takashi Tsukahara, Kawasaki, Japan, assignor to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed May 10, 1988, Ser. No. 192,313
Claims priority, application Japan, May 11, 1987, 62-113955
Int. Cl.[4] H02M 5/45
U.S. Cl. 363—37 **9 Claims**



1. A power converter for driving an AC motor at a variable speed, comprising:

a thyristor converter connected to an AC power source for rectifying an AC voltage from said AC power source; said thyristor converter having first and second DC terminals;

a DC intermediate circuit including a smoothing capacitor for charging therein a rectified output from said thyristor converter, a first diode, a second diode, a first semiconductor switch, a second semiconductor switch; said smoothing capacitor having first and second terminals; said first and second DC terminals of said thyristor converter being respectively connected to said first and second terminals of said smoothing capacitor through said first and second diodes, respectively, in a polarity relationship corresponding to forward conversion by said thyristor converter during driving of said AC motor; and during braking operation of said AC motor, said first and said second DC terminals of said thyristor converter being respectively connected to said first and said second terminals of said smoothing capacitor through said first and second semiconductor switches, respectively, in a polarity relationship corresponding to reverse conversion by said thyristor converter, whereby during driving of said AC motor, one of said first and second semiconductor switches is turned off, while the other one of said first and second semiconductor switches is caused to perform a high frequency switching operation or both of said first and second semiconductor switches are simultaneously interrupted; and during braking operation, one of said first and second semiconductor switches is rendered conductive while the other one of said first and second semiconductor switches is caused to perform a high frequency switching operation; a voltage type inverter having two terminals respectively connected to two terminals of said smoothing capacitor for inverting a DC voltage across said two terminals of said smoothing capacitor into an AC voltage having a variable frequency and a variable voltage, said AC voltage being supplied to said AC motor;

A control means for operating said thyristor converter substantially at a predetermined maximum forward conversion output voltage during driving of said AC motor, and for operating said thyristor converter substantially at a predetermined maximum reverse conversion output voltage during braking operation of said AC motor; and

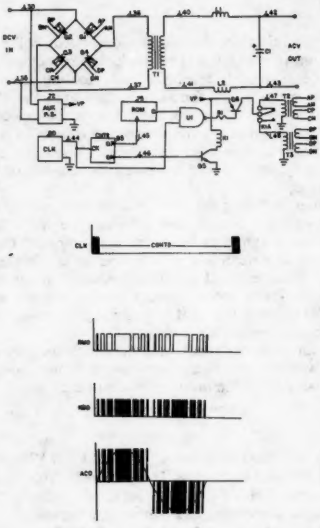
an inductive element disposed in series with at least one of the AC and DC sides of said thyristor converter.

4,879,640

ROM DRIVEN PWM INVERTER

Pawan K. Das, 101 Kent Ave., Marlton, N.J. 08053

Filed Jun. 8, 1988, Ser. No. 203,917
Int. Cl.[4] H02M 7/5387
U.S. Cl. 363—41 **7 Claims**



7. A device for generating AC power from a DC source supplying an input voltage, comprising:

input means for inputting the input voltage from the DC source;

output means for outputting a device output voltage from said device;

switching circuit means for automatically switching the input voltage;

output filter means for filtering the device output voltage to a desired AC output voltage level;

control circuit means for controlling the switching circuit means, comprising:

read only memory means, having an output, for storing switching control data;

means for repeatedly turning on and off said switching circuit means based upon the switching control data; and

NAND gate means for modulating the output of said read only memory means; and

auxiliary power supply means for generating auxiliary DC

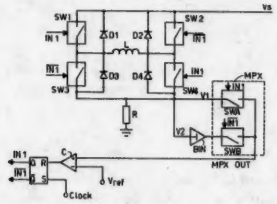
power from the DC source to supply power to said control circuit means.

4,879,641

ANALOG MULTIPLEX FOR SENSING THE MAGNITUDE AND SENSE OF THE CURRENT THROUGH A H-BRIDGE STAGE UTILIZING A SINGLE SENSING RESISTANCE

Domenico Rossi, Cilavegna, and Andrea Cuomo, Milano, both of Italy, assignors to SGS-Thomson Microelectronics S.R.L., Italy

Filed Oct. 28, 1988, Ser. No. 263,935
Claims priority, application Italy, Nov. 2, 1987, 8366 A/87
Int. Cl.[4] H02M *3/24*
U.S. Cl. 363—98 **5 Claims**



3. In a combination, H-bridge stage for driving a load in a switching mode by means of a clocked square-wave driving signal and an inverted signal thereof, and circuit means for sensing the magnitude and directions of the electric current flowing through the load, said H-bridge comprising:

two pairs of switches arranged in a bridge configuration for receiving the driving and the inverted signals, respectively, and functionally switching the load between a supply node and a virtual ground node of the bridge stage, and recirculation diodes connected across said switches;

said sensing circuit means including:

a single sensing resistor connected between the virtual ground node and a real ground node of the circuit;

an analog, two input, multiplex having two switches driven, respectively, by the driving signal and by the inverted driving signal, the input corresponding to the switch driven by the driving signal being connected to the virtual ground node and the input corresponding to the switch driven by the inverted driving signal being connected to the output of an inverting analog buffer having an input connected to the virtual ground node; and

a comparator having two input terminals and an output terminal, an output of said analog multiplex being connected to a first input terminal of said comparator and a reference voltage being applied to a second input terminal of said comparator.

4,879,642

SERVO LOOP PROCESSOR IN ASSOCIATION WITH A CENTRAL PROCESSING UNIT FOR CLOSED LOOP CONTROL OF A SERVO SYSTEM

Jacob H. Malka, Fair Lawn, and Glenn J. Ahern, Wood-Ridge, both of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

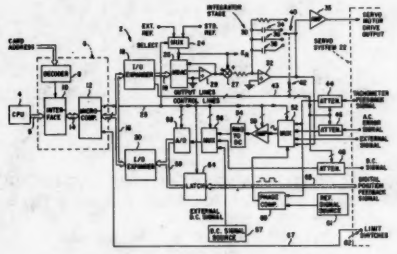
Filed Oct. 18, 1984, Ser. No. 662,321
The portion of the term of this patent subsequent to Feb. 7, 2004, has been disclaimed.
Int. Cl.[4] G05B *19/29*; G06F *15/46*
U.S. Cl. 364—131 **13 Claims**

1. A servo loop processor in association with a central processing unit for closed loop control of a servo system, characterized by:

interface means connected to the central processing unit;

the interface means including information processing means in communication with the central processing unit, whereby servo loop parameters and servo system motor characteristics are downloaded from the central processing unit to the information processing means, said information processing means providing control signals;

first means connected to the information processing means and responsive to control signals therefrom for providing a signal for driving the servo system motor, said first means including a first multiplexer receiving a plurality of reference signals and connected to the information processing means and controlled by a control signal therefrom for selecting one of the reference signals and for providing a reference signal corresponding to the selected signal, means connected to the first multiplexer and receiving the corresponding reference signal, and connected to the information processing means and controlled by a



control signal therefrom for controlling the amplitude of the corresponding reference signal and for providing an amplitude controlled signal, means for combining the corresponding reference signal and the amplitude controlled signal and for providing a combined signal, integrator means connected to the combining means for integrating the combined signal, and means connected to the integrator means and responsive to the integrated combined signal for providing a signal for driving the servo system motor; and

second means connected to the information processing means, the first means and the servo system, and responsive to a control signal from the information processing means and the signal from the first means for selectively applying feedback signals from the servo system to the information processing means.

4,879,643

DECENTRALIZED CAUTIOUS ADAPTIVE CONTROL SYSTEM

Abhijit J. M. Chakravarty, Renton; Dagfinn Gangsaas, Bellevue, both of Wash., and John B. Moore, Weetangaera, Australia, assignors to The Boeing Company, Seattle, Wash.

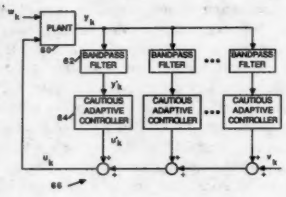
Filed Nov. 19, 1987, Ser. No. 122,780
Int. Cl.[4] G05B *13/02*
U.S. Cl. 364—148 **20 Claims**

1. Apparatus for controlling a plant producing a plant output vector in response to an input control vector, comprising:

means for filtering said plant output vector into a plurality of filtered output vectors, each comprising a separate frequency band of said plant output vector;

means for producing in response to each said filtered output

vector a separate feedback control vector in accordance with an adjustable transfer function; and



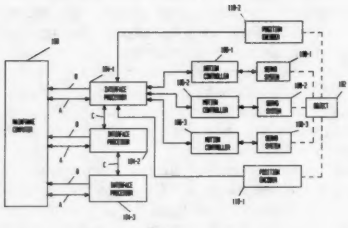
means for forming said input control vector in response to a combination of feedback control vectors.

4,879,644

OBJECT POSITIONING APPARATUS AND METHOD

R. Marc Gottshall, Des Moines, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 30, 1987, Ser. No. 139,840
Int. Cl.[4] G05B *13/00*
U.S. Cl. 364—167.01 **18 Claims**



1. A network for positioning an object, comprising:

a mainframe computer for providing macro-commands indicative of the desired movement of the object;

interface processing means for providing a plurality of micro-commands in response to each macro-command received from said mainframe computer;

servo means responsive to an applied signal for moving the object;

feedback encoder means responsive to the movement of said servo means for providing a feedback signal indicative thereof;

motion control means responsive to the micro-commands provided by said interface means for providing the applied signal to said servo means, said motion control means being further responsive to the feedback signal provided from said feedback encoder to vary the applied signal; and

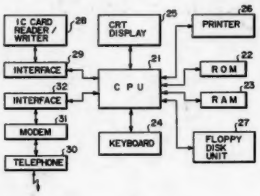
position encoder means for providing position data indicative of the position of the object, said position encoder means being coupled to supply the position data to said interface processing means, said interface processing means being adapted to process the position data and supply the processed position data to said mainframe computer.

4,879,645

DATA PROCESSING DEVICE WITH HIGH SECURITY OF STORED PROGRAMS

Masuo Tamada, Yokohama; Hitoshi Kokuryo, Sagamihara; Shinsuke Tamura, and Hiroshi Ozaki, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 714,862, Mar. 22, 1985, abandoned. This application Feb. 10, 1988, Ser. No. 157,109
Claims priority, application Japan, Mar. 31, 1984, 59-63618
Int. Cl.[4] G06F *15/30*; G06K *5/00*
U.S. Cl. 364—200 **12 Claims**



1. An IC card designed for use with a read/write terminal device and having a card-shaped housing, comprising:

memory means for storing data and programs, the programs including a specific program which must be kept secret from uses of the IC card;

password identification means for receiving a password supplied from said terminal device and judging whether or not the password is correct, according to predetermined criteria;

arithmetic operation means, connected to said memory means, for running a program specified by a command from said terminal device when the password is judged to be correct by said password identification means;

means for judging whether or not the program specified by said command is the specific program;

means for counting the number of times the specific program is run, the counted number being cleared when the IC card is powered off; and

means for (1) preventing the specific program from being run by said arithmetic operation means after the counter number reaches a predetermined value and for (2) allowing the specific program to run by said arithmetic operation means after the counted number is cleared until the counted number reaches the predetermined value.

4,879,646

DATA PROCESSING SYSTEM WITH A PIPELINED STRUCTURE FOR EDITING TRACE MEMORY CONTENTS AND TRACING OPERATIONS DURING SYSTEM DEBUGGING

Junichi Iwasaki, and Hisao Harigai, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Apr. 20, 1987, Ser. No. 39,900
Claims priority, application Japan, Apr. 18, 1986, 61-90702
Int. Cl.[4] G06F *9/38, 11/22, 11/26, 11/28*
U.S. Cl. 364—200 **10 Claims**

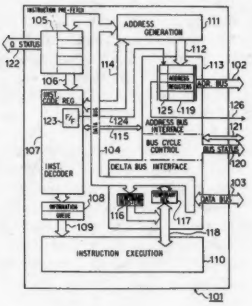
1. An information processing system including a microprocessor having a multi-stage pipeline structure, comprising:

an instruction decoding unit having an instruction decoder for decoding a received instruction code and having status indicating means having an output changing at a real time base when a predetermined instruction code, which can be used as an index in a program trace performed after a program to be tested has been executed, is decoded by said instruction decoder, said status indicating means maintaining said output when an instruction code other than said

predetermined instruction code is decoded by said instruction decoder;

address generating means coupled to said instruction decoding unit to receive at least a portion of a decoded instruction code outputted from said instruction decoder for generating an address for reading and/or writing of an operand required by said decoded instruction code;

bus control means including first register means coupled to said address generating means for temporarily holding said address for reading and/or writing of said operand required by said decoded instruction code and second register means coupled to said status indicating means for temporarily holding the output of said status indicating means when said decoded instruction code is outputted from said instruction decoder, said bus control means operating, when a bus cycle is started on the basis of said address held in said first register means, to output a content of said second register means to an external of said microprocessor in synchronism with an output timing of said address held in said first register means during a bus cycle period of said microprocessor; and



storage means for storing information outputted from said microprocessor sequentially as time-series data, said information including said address held in said first register means and said content of said second register means,

said time-series data is edited by discriminating whether the bus cycle of said microprocessor belongs to a bus cycle following an instruction on or before said predetermined instruction code for changing the output of said status indicating means or a bus cycle following an instruction on or after said predetermined instruction code, with reference to said content of said second register means stored in said storage means and indicating the output information of said status indicating means.

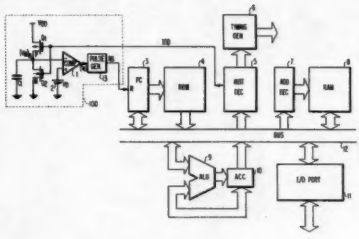
4,879,647

WATCHDOG TIMER CIRCUIT SUITED FOR USE IN MICROCOMPUTER

Akira Yazawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 11, 1986, Ser. No. 873,020
Claims priority, application Japan, Jun. 11, 1985, 60-126676
Int. Cl.[4] G06F *11/28, 11/00;* G04F *8/00*
U.S. Cl. 364—200 **15 Claims**

12. A microcomputer comprising a program memory storing a series of instrucitons, said series of instructions periodically including a predetermined instruction, a program counter designating each address of said program memory to read each instruction from said program memory, an instruction decoder decoding the instruction read from said program and outputting decoded signals, said instruction decoder including means for producing a first control signal taking a first logic level whenever said predetermined instruction is read from said program memory and taking a second logic level when other instructions are read from said program memory, execution means responsive to said decoded signals for executing the instruction read from said program memory, a first terminal supplied with a power voltage, a second terminal supplied with a reference voltage, a power-on clear terminal, a capacitor connected between said power-on clear terminal and said second terminal, a detection circuit connected to said power-on clear terminal for detecting a voltage across said capacitor to produce a second control signal when said voltage across said capacitor is smaller than a predetermined level, a clear circuit generating a reset pulse in response to said second control signal and resetting said program counter to an initial state by use of said reset pulse, means for latching said reset pulse to produce a charging control signal until said program counter reaches a predetermined count value, a first field effect



transistor connected between said first terminal and said power-on clear terminal for charging, when turned ON, said capacitor, a second field effect transistor connected between said power-on clear terminal and said second terminal in parallel with said capacitor for discharging, when turned ON, said capacitor, means responsive to said charging control signal for turning said first field effect transistor ON, means responsive to said first logic level of said first control signal for turning said first field effect transistor ON, and means responsive second logic level of said first control signal for turning said second field effect transistor ON, whereby said program counter is reset to said initial state not only when said power voltage is switched on to be supplied to said first terminal but when said predetermined instruction is not read from said program memory over a predetermined of time.

4,879,648

SEARCH SYSTEM WHICH CONTINUOUSLY DISPLAYS SEARCH TERMS DURING SCROLLING AND SELECTIONS OF INDIVIDUALLY DISPLAYED DATA SETS

Nancy P. Cochran, 35 Main St., Nyack, N.Y. 10960, and Susan Byrnes, East Hartford, Conn., assignors to Nancy P. Cochran, Nyack, N.Y.

Filed Sep. 19, 1986, Ser. No. 909,293
Int. Cl.[4] G06F *3/14*
U.S. Cl. 364—300 **38 Claims**

1. A method of selecting desired data sets from a plurality of data sets that are categorized and sequentially ordered into a plurality of lists, comprising the steps of:

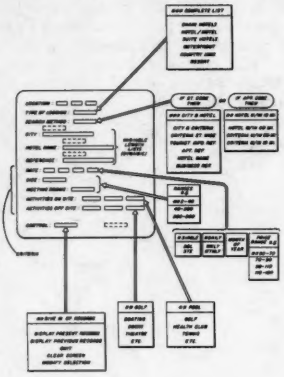
continuously displaying a plurality of categorical identifiers at respective coordinates on a display medium, at least some of said categorical identifiers being displayed simultaneously during at least a portion of the displaying of said categorical identifiers, and each of said categorical identifiers corresponding to at least one of said plurality of lists;

providing two control inputs, one as a scrolling control and a second as a select control;

sequentially displaying, one at a time, data sets in one list corresponding to a respective one of said displayed categorical identifiers upon sequential application of said scrolling control;

selecting a desired data set that is currently displayed and selecting another of said displayed categorical identifiers corresponding to another one of said plurality of lists, both upon application of said select control;

sequentially displaying, one at a time, sequential data sets of respective additional lists next to said another displayed categorical identifier and any desired additional displayed



categorical identifiers, upon application of said scrolling control; and

selecting respective data sets of said another displayed categorical identifier and each of said desired additional displayed categorical identifiers, and moving to respective ones of each of said desired additional displayed categorical identifiers, both upon application of said select control.

4,879,649

TRANSACTION PROCESSING APPARATUS HAVING PLU FUNCTION

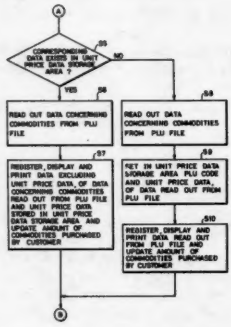
Hiroaki Ishii, Ootsu, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Jan. 25, 1988, Ser. No. 147,728

Claims priority, application Japan, Jan. 28, 1987, 62-17801; Apr. 16, 1987, 62-93982

Int. Cl.[4] G07G *1/12*

U.S. Cl. 364—405 **5 Claims**


A
CORRESPONDING DATA EXISTS IN UNIT PRICE DATA STORAGE AREA ?
S5
S6
YES
S8
READ OUT DATA CONCERNING COMMODITIES FROM PLU FILE
READ OUT DATA CONCERNING COMMODITIES FROM PLU FILE
S7
S9
REGISTER, DISPLAY AND PRINT DATA EXCLUDING UNIT PRICE DATA, OF DATA CONCERNING COMMODITIES READ OUT FROM PLU FILE AND UNIT PRICE DATA STORED IN UNIT PRICE DATA STORAGE AREA AND UPDATE AMOUNT OF COMMODITIES PURCHASED BY CUSTOMER
SET IN UNIT PRICE DATA STORAGE AREA PLU CODE AND UNIT PRICE DATA, OF DATA READ OUT FROM PLU FILE
S10
REGISTER, DISPLAY AND PRINT DATA READ OUT FROM PLU FILE AND UPDATE AMOUNT OF COMMODITIES PURCHASED BY CUSTOMER
B

1. A transaction processing apparatus comprising:

first means for storing in advance and respectively for each commodity, commodity identification data and other commodity data corresponding to the commodity identified by the commodity identification data, said other commodity data including unit price data,

second means for storing commodity identification data and corresponding unit price data,

means for entering commodity identification data,

means responsive to the entry of the commodity identification data with said entering means for registering the data concerning a commodity corresponding to the entered commodity identification data,

means for determining whether or not the unit price data corresponding to the entered commodity identification data is already stored in said second storing means each time the commodity identification data is entered with said entering means, and

control means responsive to a determination by said determining means that the unit price data entered by said entering means is not stored in said second storing means for reading out from said first storing means the data concerning commodities corresponding to the commodity identification data entered with said entering means and storing the entered commodity identification data and the data concerning commodities corresponding to the entered commodity identification data in said second storing means and for registering the data concerning commodities read out from said first storing means with said registering means, and responsive to a determination by said determining means that the unit price data corresponding to the commodity identification data entered with said entering means is stored in said second storing means for registering the unit price data corresponding to the commodity identification data stored in said second storing means and data, excluding the unit price data, concerning commodities corresponding to the entered commodity identification data which is stored in said first storing means.

4,879,650

POS REGISTER SYSTEM WITH COMBINED OPTICAL SCANNER AND WEIGHING MACHINE

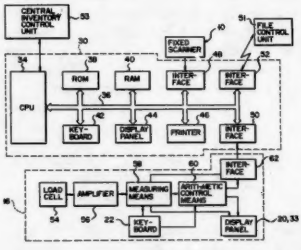
Yukuo Kurimoto, and Takayoshi Endo, both of Shizuoka, Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Oct. 30, 1986, Ser. No. 925,816

Claims priority, application Japan, Nov. 7, 1985, 60-249372

Int. Cl.[4] G07G *1/14;* G01G *19/40*

U.S. Cl. 364—405 **5 Claims**



1. A point-of-sale register system, comprising:

an electronic cash register connected to a central inventory control unit to serve as a terminal device of a point-of-sale system;

a substantially free standing electronic weighing machine electrically connected to said electronic cash register including measuring means for weighing a product, said measuring means being electrically connected to said electronic cash register for supplying to the electronic cash register an electrical signal corresponding to the measured weight of the product, said weighing machine being separate from said cash register and being separable

from and removably mounted on an outer surface of a check-out counter;

optical scanner means mounted on top of said weighing machine, in a direction in which gravity acts, said optical scanner means including:

receiving means for receiving a product to be weighed thereon, said receiving means transmitting a weight of a product placed on said receiving means to said measuring means of said weighing machine for measuring the weight of the product placed on said receiving means; and

optical scanning means electrically connected to said electronic cash register for optically scanning a bar code on a product placed on said receiving means and for providing to the electronic cash register an electrical signal corresponding to the scanned bar code; and

wherein the weight of the product placed on said receiving means of said optical scanner means is measured by said measuring means of said weighing machine, and the bar code on the product placed on said receiving means of said optical scanner means is scanned by said optical scanning means.

4,879,651

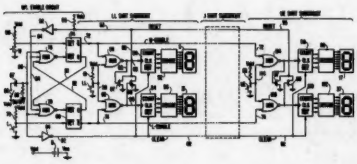
GAME POINT SCORING AND ANALYZING DEVICE

Robert E. Little, Jr., G-5 Harbour West Condominiums, Rocky Mount, N.C. 27801

Continuation of Ser. No. 851,215, Apr. 14, 1986, abandoned. This application Jan. 5, 1989, Ser. No. 293,536

Int. Cl.[4] G06F *15/44*; G08B *23/00*

U.S. Cl. 364—411 **9 Claims**



1. A game point scoring and analyzing device for tabulating and displaying for a plurality of different shot categories the number of shots in each category which resulted in game points won and lost by an individual during a game, comprising:

(a) an electronic circuit mounted within a portable display case of a size to be worn on the individual's wrist, means for providing power to the electronic circuit through an ON/OFF switch, said electronic circuit including first and second electronic counters and first and second numerical displays for each shot category, said first numerical displays representing points won by the individual and said second numerical displays representing points lost by the individual, each of said electronic counters having a clock terminal for increasing a count and having a counter reset terminal for resetting the counter to zero;

(b) first and second counter control gates connected to said first and second electronic counters, respectively, each of said counter control gates having first and second inputs and an output connected to said clock terminal of the associated electronic counter and operates in response to said first and second inputs being enabled to increment the associated electronic counter;

(c) a point-won and a point-lost enable circuit, said point-won enable circuit including input terminal means and output terminal means, said output terminal means of said point-won enable circuit being connected to said first inputs of said first counter gate for each of said first electronic counters, said point-lost enabling circuit including input terminal means and output terminal means, said output terminal means of said point-lost enable circuit being connected to said first input of said second counter gate for each of said second electronic counters;

(d) a point-won button means operative when actuated to enable said input terminal of said point-won enable circuit, and a point-lost button means operative when actuated to enable said input terminal of said point-lost enable circuit;

(e) a plurality of shot button means, one for each different shot category, each shot button means being connected to said second inputs of both said first and second counter gates in each different shot category, and each shot button means being manually operable to enable said second inputs of said first and second counter gates; and

(f) and gate means coupled with said first and second counter control gates for each different shot category and said point-won and point-lost enable circuits, and operative to establish a required sequence which requires the pressing of said point-won or said point-lost button means prior to the pressing of a shot button means in order to increment a count in any of said first and second electronic counters;

(g) said input terminal means of said point-won and point-lost enable circuits respectively, include a point-won flipflop and a point-lost flipflop, each flipflop including a set and a reset terminal, said gate means including first and second enable circuit gates, said first enable circuit gate having an output coupled to the reset terminal of said point-won flipflop and having an input connected to said first counter control gates, said second enable circuit gate having an output coupled to the reset terminal of said point-lost flipflop and having an input connected to said second counter control gates, said first and second enable circuits being operative to reset both flipflops whenever any of said first or second counter control gates increments an electronic counter,

(h) said first and second enable circuit gates have second inputs, said second input of said first enable circuit gate being connected to an output of said point-lost flipflop and said second input of said second enable circuit gate being connected to an output of said point-won flipflop, said second inputs of said first and second enable circuit gates being operative to deliver outputs to reset one flipflop when the other flipflop is set, whereby the information regarding points won and lost in each of the plurality of different shot categories is readily available for immediate use by the individual while a game is in progress.

4,879,652

METHOD FOR PRODUCING THREE-DIMENSIONAL IMAGES FROM NUCLEAR DATA

David J. Nowak, Greendale, Wis., assignor to General Electric Company, Milwaukee, Wis.

Filed Sep. 4, 1987, Ser. No. 93,437

Int. Cl.[4] G06F *15/42*

U.S. Cl. 364—413.18 **6 Claims**

1. A method for producing a shaded image from data acquired with a nuclear imaging tomographic scanner, the steps comprising:

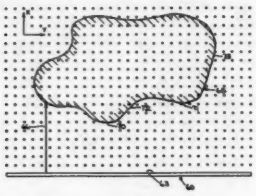
(a) acquiring a sequence of two-dimensional frames of nuclear event data which is reconstructed to form a three-dimensional array of data V(x,y,z) which indicates the number of nuclear events at a three-dimensional matrix of points throughout a volume of interest;

(b) extending into the volume of interest a projector from a pixel in a projection plane to determine the distance between that pixel in the projection plane and the boundary of an object within the volume of interest, including the steps of:

(i) extending the projector an incremental distance away from the projection plane,

(ii) calculating the number of nuclear events at the current position of the projector from the three-dimensional array of data, V(x,y,z),

(iii) comparing the calculated number of nuclear events with a pre-established threshold value,
(iv) reiterating steps i–iii if the threshold value is not reached, otherwise,
(v) calculating the location at which the projector intersects the object's boundary by interpolating between the current calculated number of nuclear events and the calculated number of nuclear events from the previous iteration to arrive at a location between the projector's



current position and its position for the previous iteration;
(c) producing a two-dimensional array of distance data D(z,y) by repeating step (b) for each pixel in the projection plane; and
(d) producing a two-dimensional display data array DS(z,y) by assigning a brightness value to each element in the display data array which is a function of the distance value of its corresponding element in the distance array D(z,y).

4,879,653

SELECTION SYSTEM FOR IDEOGRAPHIC CHARACTERS BY TOUCH TYPING USING PHONETIC/HIEROGLYPHIC CODES

Yoshinori Shinoto, 42,3-chome, Sakuradai, Nerima-Ku, Tokyo, Japan

Continuation of Ser. No. 741,688, Jun. 6, 1985, abandoned. This application Nov. 30, 1987, Ser. No. 125,729
Claims priority, application Japan, Jun. 7, 1984, 59-115584
Int. Cl.[4] G06F *3/02*
U.S. Cl. 364—419 **3 Claims**

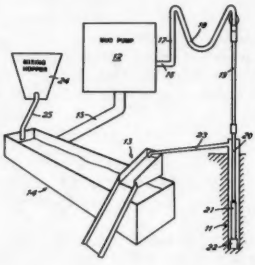
1. A system for ideographic character selection comprising, storing means for storing a plurality of ideographic characters each of which has ideographic elements, means for forming by touch typing on a keyboard combinatorial headwords which have one-to-one correspondence with the ideographic characters stored in the storing means, means for combining a selected phonogram word with a selected hieroglyphic word to obtain selected one of the combinatorial headwords, and selector means for selecting a desired ideographic character output in correspondence with selection instruction thereto with the selected one of the combinatorial headwords obtained.

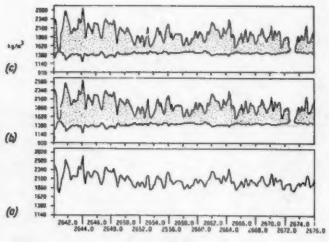
4,879,654

DRILLING FLUID

Sue Bruce, Huntingdon, England, assignor to Schlumberger Technology Corporation, Houston, Tex.

Filed Feb. 1, 1988, Ser. No. 150,815
Claims priority, application United Kingdom, Feb. 10, 1987, 8702920
Int. Cl.[4] E21B *21/08*; G01N *9/04*
U.S. Cl. 364—422 **9 Claims**





1. A method for improving the process of drilling a deviated borehole through a subsurface formation by determining a safe value of the density of drilling fluid to be circulated through the borehole while the deviated borehole is being drilled, the method comprising the steps of:
a determining the in-situ stress state of the formation at the site of the borehole,
b. converting the in-situ stress state of step a. into the stresses that exist in the projected direction of the borehole axis and in two orthogonal directions perpendicular to that borehole axis;
c. in response to step b. and to an assumed drilling fluid density, calculating the stress which will occur at the borehole wall as a function of depth when the borehole is drilled,
d. determining formation pore pressure as a function of depth,
e. in response to step c, determining the value of drilling fluid density at a given depth which satisfies a tensile failure criterion of the material forming the borehole wall,
f. in response to step c, determining at least one value of drilling fluid density at said given depth which satisfies a shear failure criterion of the material forming the borehole wall,
g. in response to step d, calculating a drilling fluid density value which gives drilling fluid pressure equal to the formation pore pressure as a function of depth,

h. at said given depth, in response to at least the valve obtained in step (e), determining a maximum value for the drilling fluid density,

i. at said given depth, selecting as a minimum value for the drilling fluid density, the higher of the values obtained at that depth in steps f and g, and

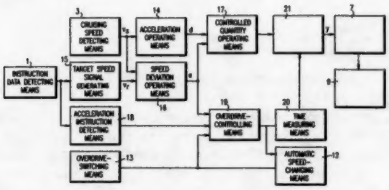
j. mixing solid and liquid drilling fluid components in such proportion that the density of the drilling fluid lies between the selected valvues of steps h and i.

4,879,655

CONSTANT SPEED CRUISING CONTROL APPARATUS

Akihiko Mori, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 4, 1988, Ser. No. 177,327
Claims priority, application Japan, Apr. 15, 1987, 62-93526
Int. Cl.[4] B60K *41/00*
U.S. Cl. 364—426.04 2 Claims



1. A constant speed cruising control apparatus for an automobile which comprises:

a cruising speed detecting means for detecting a cruising speed of an automobile;

an acceleration speed operating means for calculating an acceleration speed at predetermined time intervals on the basis of the output of said cruising speed detecting means;

an instruction data detecting means for detecting instruction data from a driver;

a target speed signal generating means for generating a target speed signal on the basis of said instruction data;

a speed deviation operating means for calculating the deviation between the cruising speed of the automobile and a target speed;

a driving force controlling means for controlling the driving force of said automobile;

a controlled quantity operating means for receiving an acceleration signal from said acceleration speed operating means and a speed deviation signal from said speed deviation operating means so that a controlled quantity for controlling the driving force of the automobile is operated so as to coincide the cruising speed with the target speed;

an overdrive-switching means for generating an overdrive switching signal which permits or prohibits overdrive-cruising of the automobile;

an acceleration instruction detecting means for receiving said instruction data to detect the demand of acceleration by said driver;

an overdrive-controlling means for receiving said overdrive-switching signal and said speed deviation signal and said acceleration instruction signal and for generating an overdrive controlling signal prohibiting the overdrive cruising of the automobile;

a time measuring means for measuring a first predetermined time from the time when said overdrive cruising prohibiting signal is generated, and for measuring a second predetermined time from the time when said overdrive cruising prohibiting signal is stopped;

a controlled quantity signal outputting means for outputting to said drive force controlling means a signal of a controlled quantity which is so corrected as to reduce the driving force for the automobile during said first and second predetermined times; and

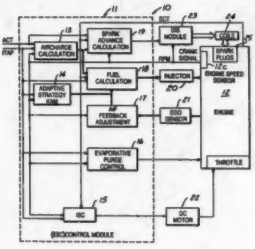
an automatic speed-changing means which receives said overdrive-switching signal and said overdrive controlling signal to automatically control the change of speed of the automobile.

4,879,656

ENGINE CONTROL SYSTEM WITH ADAPTIVE AIR CHARGE CONTROL

John H. Quigley, West Bloomfield, and Roger K. Feller, Canton, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Oct. 26, 1987, Ser. No. 112,789
Int. Cl.[4] F02M *17/00*; F02B *3/00*
U.S. Cl. 364—431.05 14 Claims



1. An engine control system for controlling an engine by determining engine load based upon engine air charge comprising:

an air charge determination means for determining the amount of engine air charge and generating a signal as a function of engine throttle angle which defines engine load;

storage means for storing, as a function of received engine speed and engine air charge, a desired engine spark advance in a first table, a desired engine fuel quantity in a second table;

an engine speed sensor for sensing engine speed and generating a signal as a function of engine speed;

reference means for storing a base air charge as a function of a received engine speed;

an exhaust gas oxygen sensor coupled functionally and operationally to an exhaust of the engine for generating a feedback signal as a function of an air fuel ratio supplied to the engine;

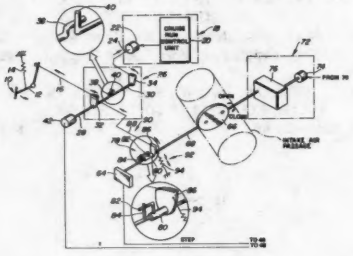
a logic operation means coupled to said air charge determination means, said exhaust gas oxygen sensor, said storage means, said reference means and said engine speed sensor for determining the desired engine spark advance and fuel quantity by using the determined air charge to determine a position on an air charge axis of said first and second tables and using the sensed engine speed to determine a position on an engine speed axis of said first and second tables, thereby determining the desired engine spark advance and fuel quantity for engine operation, and for modifying engine air charge adaptively based upon feedback from said exhaust gas oxygen sensor to maintain stoichiometry which, in turn, results in change in the engine spark advance and fuel quantity.

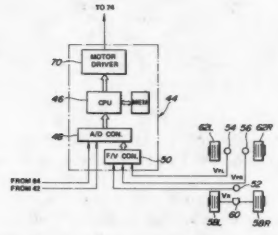
4,879,657

SYSTEM AND METHOD FOR ELECTRONICALLY CONTROLLING A VEHICULAR ENGINE OPERATION HAVING A SAFE FUNCTION

Minoru Tamura, Kanagawa; Shinji Katayose, Tokyo; Terukiyo Murakami, and Hisashi Izumi, both of Kanagawa, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Mar. 17, 1988, Ser. No. 169,500
Claims priority, application Japan, Mar. 26, 1987, 62-72676
Int. Cl.[4] B60K *31/02*; F02D *41/26*
U.S. Cl. 364—431.07 30 Claims





21. A system for controlling a vehicular engine operation, comprising:

(a) first means for electronically controlling a vehicular engine driving force adjusting mechanism associated with the engine in accordance with a first operating variable of a vehicular accelerator which corresponds to a desired parameter of the engine driving force mechanism adjusting and for determining a target parameter according to the first operating variable of the accelerator, so that a present parameter of the driving force adjustment mechanism coincides with the target parameter determined according to the first operating variable;

(b) second means for automatically controlling the parameter of the engine driving force adjusting mechanism in response to a command to set current vehicle speed to a desired cruise speed without operation of the accelerator so that the parameter of the engine driving force adjusting mechanism coincides with a second operating variable which corresponds to the set cruise speed and the vehicle speed is maintained at the desired cruise speed; and

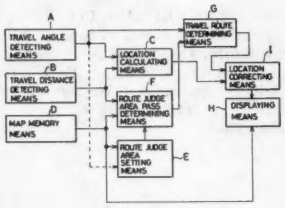
(c) third means for preventing a further increase of the engine driving force adjusting parameter of the engine driving force adjusting mechanism which would result in the parameter exceeding both of the first and second operating variables.

4,879,658

NAVIGATION SYSTEM USING ANGULAR RATE SENSOR

Makoto Takashima; Yoshihito Aoki, and Takahiro Oikawa, all of Shizuoka, Japan, assignors to Yazaki Corporation, Japan

Filed Feb. 9, 1988, Ser. No. 154,106
Claims priority, application Japan, Feb. 10, 1987, 62-27279; Feb. 10, 1987, 62-27280; Feb. 10, 1987, 62-27281
Int. Cl.[4] G06F *15/50*
U.S. Cl. 364—449 12 Claims



1. A navigation system for displaying travel locations of a vehicle on a displayed map, comprising:

(a) means for detecting vehicle travel angle;

(b) means for detecting vehicle travel distance;

(c) means, coupled to said vehicle travel angle detecting means and said vehicle travel distance detecting means, for calculating vehicle locations on the basis of the detected vehicle travel angles and distances;

(d) means for storing map information data including branch points;

(e) means, coupled to said map information data storing means, for setting a route judge area at each branch point to determine a route along which the vehicle travels from a branch point;

(f) means, coupled to said vehicle distance detecting means, said map storing means and said route judge area setting means, for determining a condition of a vehicle passing into the set route judge area when a distance between a current vehicle location and a succeeding branch point becomes shorter than a first predetermined distance and a condition of a vehicle passing through the set route judge area when a distance between a position, at which the vehicle enters the set route judge area, and a current vehicle location becomes longer than a second predetermined distance;

(g) means, coupled to said vehicle travel angle detecting means and said route judge area pass determining means, for determining a travel route at each branch point by comparing a travel angle detected by said travel angle detecting means with map data stored in said map data storing means when the vehicle has passed through the set route judge area;

(h) means, coupled to said vehicle location calculating means and said travel route determining means, for correcting said calculated vehicle locations so as to be located along a road on a displayed map in accordance with predetermined expressions, said vehicle location calculating means further correcting a vehicle after-turn location at each branch point by matching a vehicle turn point obtained when said route judge area pass determining means detects that the vehicle has passed through said route judge area with a map branch point within the route judge area; and

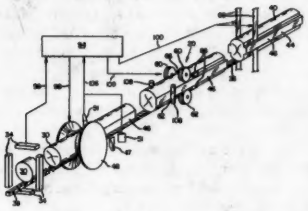
(i) means, coupled to said correcting means, said map data storing means, said route judge area setting means, and said route judge area pass determining means, for displaying a map stored in said map information data storing means and vehicle locations calculated by said calculating means and corrected by said location correcting means.

4,879,659

LOG PROCESSING SYSTEMS

William P. Bowlin, Rte. 10, Box 206, Shreveport, La. 71129; Michael P. Knerr, 499 S. 9th, Ridgefield, Wash. 98642, and Jeffrey D. Ballance, 4723Bramblewood, Albany, Oreg. 97321

Filed Nov. 24, 1987, Ser. No. 125,019
Int. Cl.[4] B02C *25/00*
U.S. Cl. 364—468 13 Claims



1. A computer controlled processing system for lumber production comprising;

a computer,

a sequence of processing stations for processing a log segment including; an excess material removing station for generating opposed flat side surfaces on the log segment, said flat side surfaces determined by the computer to become sides of boards to be severed from said log segments; a profiling station for forming profiled edges above and below said flat side surfaces to become the side edges of the boards to be severed from the log segment, and a severing station for severing the boards from the log segments,

a conveyance means establishing a path of conveyance and having continuous control of the log segment in conveying the log segment along the path and through the above defined sequence of processing stations, and the improvement that comprises;

scanning means prior to the profiling station for obtaining data of the configuration of the log segment in three dimensions, and said computer receiving said data and projecting the optimum side boards obtainable from the log segment including location and angular orientation of the side boards relative to the log segments conveyed along the path of conveyance; and

said profiling station including adjustable profiling heads and said computer controlling the adjustable profiling heads, said profiling heads being continuously responsive to said computer to form the edges of the projected side boards during conveyance of the log segment through the profiling station.

4,879,660

THREAD CUTTING MACHINE WITH SYNCHRONIZED FEED AND ROTATION MOTORS

Koichi Asakura, Toyoake; Makoto Demura, Toyokawa, and Takenori Matsumoto, Kasugai, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Mar. 28, 1988, Ser. No. 174,508
Claims priority, application Japan, Mar. 31, 1987, 62-80524; Apr. 2, 1987, 62-82128; Aug. 28, 1987, 62-215820; Aug. 28, 1987, 62-215821
Int. Cl.[4] B23G *1/16;* G05B *19/18*
U.S. Cl. 364—474.15 10 Claims

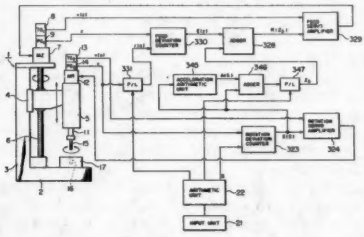
7. In a thread cutting machine including a spindle for holding a thread cutting tool, a spindle head for supporting said spindle, a spindle motor for rotating said spindle, a feed motor for driving said spindle head, a detector for detecting a rotating position of said spindle, a detector for detecting a feed position and a feed amount of said spindle head, and wherein thread cutting working is conducted under synchronous driving operation of said spindle motor and said feed motor, said thread cutting machine comprising:

means for computing a rotation deviation between a rotation instruction and a rotating position of said spindle detected by the rotating position detector;

means operatively connected to said rotation deviation computing means for driving said spindle motor in accordance with the rotation deviation;

means for computing a rotation speed and an acceleration;

means for computing a feed instruction corresponding to the computed feed speed and acceleration on the basis of a thread pitch;



means operatively connected to said feed instruction computing means for computing a feed correction value corresponding to the detected rotating position of said spindle on the basis of the thread pitch;

means operatively connected to said feed correction computing means and said feed position detector for computing a feed deviation between the feed correction value and the detected feed amount of the spindle head;

means operatively connected to said feed deviation computing means for correcting the feed instruction on the basis of said feed deviation; and

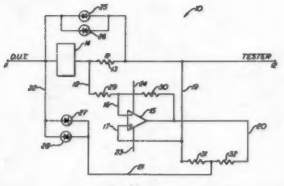
means operatively connected to said correcting means for driving the feed motor in accordance with said corrected feed instruction.

4,879,661

BI-DIRECTIONAL CIRCUIT TO INTERFACE BETWEEN A LOW CURRENT DEVICE AND HIGH CURRENT TESTER

Floyd W. Olsen, Endicott, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 2, 1987, Ser. No. 104,326
Int. Cl.[4] G01R *19/00;* H03M *5/00*
U.S. Cl. 364—483 12 Claims



1. An interface circuit for connecting test instrumentation reflecting at least 100 pico farads of capacitive loading at its terminals, to test a low current monolithic device, said interface circuit comprising:

input buffer amplifier means with an input terminal connected to a device under test to provide a driving voltage at an output terminal to drive said test instrumentation in

response to a voltage output from said low current monolithic device;

sensing resistance means connected with said input buffer amplifier means for matching, along with an internal resistance of said input buffer amplifier means, a resistance reflected by said test instrumentation; and

operational amplifier circuit means in said interface circuit connected to drive said monolithic device in response to a voltage across said sensing resistance means that is developed by said test instrumentation.

4,879,662

FLUID FLOW SELF CALIBRATION SCHEME

John J. Vicari, and Peter J. Suttie, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Mar. 11, 1988, Ser. No. 167,033

Int. Cl.[4] G06F *25/00*

U.S. Cl. 364—510 8 Claims

1. A method of providing an in-flight accurate fluid flow rate calibration curve for a metering system comprising:

providing pressurized fluid for utilization by a receiver through conduits including a first shut-off valve that is intermittently operated during flight and a variable area metering valve;

providing a plurality of fixed calibration orifices, each with a pressure drop sensor and calibrated at a particular, different set point such that for a given pressure drop across the orifice the flow rate through that orifice is precisely known;

supplying said pressurized fluid through said variable area metering valve to a selected one of said fixed calibration orifices in sequence during flight while said first shut-off valve is closed; and

recording the precise position of said variable area metering valve in the memory correlated with the known flow rates associated with each of said calibration orifices for subsequent retrieval and use during flight for controlling said variable area metering valve to regulate the flow rate to said receiver.

4,879,663

METHOD FOR DETERMINING POINTS IN SPACE GUIDING THE MOVEMENT OF A ROBOT ARM

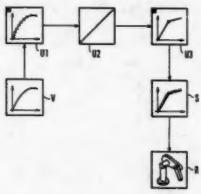
Diethelm Fuehrer, Uttenreuth, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jul. 9, 1987, Ser. No. 71,481

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1986, 3623070

Int. Cl.[4] G05B *19/18*

U.S. Cl. 364—513 2 Claims



1. A data processing method for determining points in space guiding the control of a robot arm having a predetermined position tolerance, the points defining break points in successive continuous linear motion sections of the robot arm which, in total, approximate an ideal motion trajectory for the robot arm, the method comprising the steps of:

(a) resolving by means of a converter the ideal motion trajectory into N short linear segments from a starting point on the ideal motion trajectory, through N-1 successive intermediate points, to a destination point on the ideal motion trajectory;

(b) storing the coordinates of the N+1 points of the N ideal motion trajectory linear segments;

(c) storing the coordinates of the starting point of the trajectory as a current starting point of a first extended line and therefore as a first point in space from which the robot arm is to be moved;

(d) utilizing the intermediate point on the ideal motion trajectory immediately following the current starting point as a first extension point and as a current auxiliary point for a temporary fixation of the extended line in space from the current starting point through the current auxiliary point toward a current extension point;

(e) defining the extended line in space by the coordinates of the current starting point and the coordinates of the current auxiliary point;

(f) establishing the current extension point on the extended line as that point on the extended line closest to a next following previously unconsidered intermediate point on the ideal motion trajectory;

(g) calculating the minimum distance between the next following previously unconsidered intermediate point on the ideal motion trajectory and the current extension point;

(h) if the distance is greater than the predetermined position tolerance of the robot arm, storing an immediately preceding extension point in memory as the break point of a robot arm linear motion section and as a current starting point of a subsequent robot arm linear motion section;

(i) if the distance is less than the predetermined position tolerance of the robot arm, dividing the distance between the current auxiliary point and the just considered intermediate point on the ideal motion trajectory in accordance with a count of the already considered intermediate points since the determination of the current starting points and relocating the current auxiliary point to a dividing point closest to the current auxiliary point;

(j) repeating the process steps (e) through (i) until the test of step (h) is satisfied;

(k) repeating steps (d) through (k) until all N+1 trajectory points have been considered; and

(l) moving the robot arm between the points in space determined in steps (a)–(k).

4,879,664

THREE-DIMENSIONAL POSITION SENSOR AND THREE-DIMENSIONAL POSITION SETTING SYSTEM

Toshimitsu Suyama, Ohmorinishi, and Yasutomo Fujimori, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

PCT No. PCT/JP86/00033, § 371 Date Jan. 23, 1987, § 102(e) Date Jan. 23, 1987

PCT Filed Jan. 28, 1986, Ser. No. 23,553

Claims priority, application Japan, May 23, 1985, 60-110909; Aug. 9, 1985, 60-175517; Oct. 22, 1985, 60-235678

Int. Cl.[4] G01B *11/00;* G01C *15/00*

U.S. Cl. 364—518 18 Claims

1. A three-dimensional position sensor for detecting a three-dimensional position and a posture with respect to a position setting point indicated on an object, comprising:

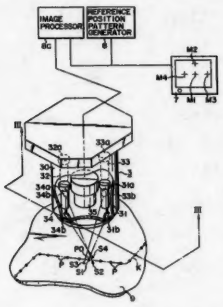
a sensor body;

projecting means having a first projector for projecting a first light beam onto the object so as to form a first bright spot thereon to detect a distance between said sensor body and the position setting point, and a plurality of second projectors mounted on said sensor body for projecting a plurality of second light beams onto the object so as to form a plurality of second bright spots cooperating with the first bright spot to form at least a triangle, said projecting means being arranged to obliquely project the light beams onto the object to form said first and second bright spots on a surface of the object, the plurality of bright

spots being formed to constitute at least three vertices of the triangle;

image pickup means for picking up an image including the bright spots formed on the object by said projecting means, the position setting point indicated on the object, and the surface of the object; and

image processing means for electrically reading the bright spots and the position setting point which are picked up by said image pickup means and for detecting the three-dimensional position and the posture of said sensor body



with respect to the object on the basis of the first and second bright spots

wherein said image processing means includes means for detecting the distance between said sensor body and the position setting point through the first bright spot formed on the object upon emission of the exclusive light beam from said first projector; and

wherein said projecting means comprises illuminating means for illuminating the surface of the object at a brightness level falling between a brightness level of the first and second bright spots and that of external disturbing light.

4,879,665

MEDICAL PICTURE FILING SYSTEM

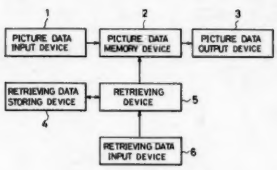
Yuichiro Akatsuka, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Sep. 4, 1985, Ser. No. 772,517

Claims priority, application Japan, Sep. 29, 1984, 59-202982

Int. Cl.[4] G06F *15/42*

U.S. Cl. 364—518 **11 Claims**



1. A medical picture filing system for storage and retrieval of input picture data from a video signal, said medical picture filing system comprising;

picture data input means for inputting said video signal representing said input picture data;

picture data memory means connected to said picture data input means, said picture data memory means for storing said input picture data;

retrieving means connected to said picture data memory means, said retrieving means for determining storage addresses for said picture data in said picture data memory means, said retrieving means for retrieving said picture data from said picture data memory means;

retrieving data input means connected to said retrieving means, said retrieving data input means for receiving retrieving data input thereto, said retrieving data being information which describes said picture data;

retrieving data storing means connected to said retrieving means, said retrieving data storage means for storing said addresses of said input picture data, said retrieving data storing means for storing said retrieving data about said input picture data input from said retrieving data input means; and

picture data output means connected to said picture data memory means, said picture data output means for outputting said picture data from said picture data memory means when said picture data is retrieved from said picture data memory means by said retrieving means,

wherein said retrieving data is formed as a block of information which is common to all input picture data obtained in a one-time examination.

4,879,666

INFORMATION OUTPUT DEVICE HAVING DATA BUFFER FOR PERFORMING BOTH CHARACTER POSITIONING AND CHARACTER EXPANSION/COMPRESSION

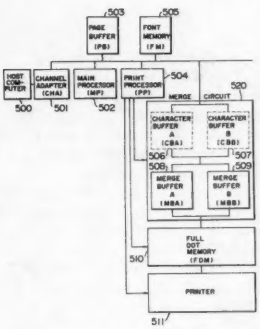
Nobumitsu Kembo, Hadano, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed May 15, 1987, Ser. No. 49,937

Claims priority, application Japan, May 19, 1986, 61-114038; Jan. 20, 1987, 62-10193

Int. Cl.[4] G06K *15/00*

U.S. Cl. 364—519 **6 Claims**



1. An information output device comprising:

a font memory for storing character data;

a full-dot memory for storing data read from the font memory through a buffer circuit at any desired position within the full-dot memory;

said buffer circuit connected between said font memory and said full-dot memory, including at least one data buffer having a write word direction and a read word direction which are orthogonal to each other;

a control unit coupled to said buffer circuit and having memory means for storing information to specify data to be read from said font memory and information to specify a manner of expansion/compression of the data to be stored in said full-dot memory and a position for storage therein, and controller means for controlling said buffer circuit to effect writing of data from said font memory into said buffer circuit and reading of data from said buffer circuit into said full-dot memory as dot-expanded or dot-compressed data in accordance with said expansion/compression information at a selected position in said full-dot

memory by shifting the data read from said font memory by an amount determined by said position information during the writing of the data into said data buffer to position the data in said data buffer and reading said data from said data buffer into said full-dot memory while expanding or compressing the data; and

information output means for reading and outputting the data stored in said full-dot memory;

wherein the number of data buffers is at least two and the two data buffers are buffers having the same function and which operate alternately to store data from said font memory.

4,879,667

PROCESS FOR GENERATING A COMPUTER MODEL OF AN ALTERABLE STRUCTURE

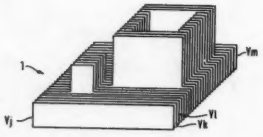
Werner Gorski, Haslach, and Josef Huber, Engelsberg, both of Fed. Rep. of Germany, assignors to Dr. Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany

Continuation of Ser. No. 691,666, Jan. 15, 1985, abandoned. This application Aug. 2, 1988, Ser. No. 227,464

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1984, 3403677

Int. Cl.[4] G06F *15/40*; G06G *7/48*; G06K *9/00*

U.S. Cl. 364—522 **7 Claims**



1. A process for generating a data structure for a computer model of a structure which is alterable by an object having a defined path, said process comprising the following steps:

(a) defining a two dimensional grid over a two dimensional contour defined by the structure, said grid comprising a multiplicity of grid points, each addressable by a unique set of coordinates in a first plane;

(b) assigning a respective first signal to each of the grid points, each first signal indicative of the thickness of the structure in a third dimension at the coordinates of the respective grid point; and

(c) altering selected ones of the first signals in response to the object and the path of the object in order to simulate alteration to the structure.

4,879,668

METHOD OF DISPLAYING INTERNAL SURFACES OF THREE-DIMENSIONAL MEDICAL IMAGES

Harvey E. Cline, Schenectady; Siegwalt Ludke, Scotia, and William E. Lorensen, Ballston Lake, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 19, 1986, Ser. No. 943,357

Int. Cl.[4] G06F *15/42*

U.S. Cl. 364—522 **8 Claims**

1. An apparatus for displaying three-dimensional structure surfaces, said apparatus comprising:

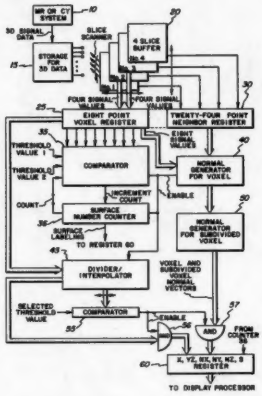
means for storing three-dimensional signal patterns, each signal pattern containing a value of at least one physical property measured at each of regularly spaced three-dimensional grid locations within a three-dimensional body;

means for sequentially and progressively scanning through said three-dimensional signal patterns in said storing means to retrieve those three-dimensional signal patterns associated with a preselective unidirectional sequence of said grid locations within said body;

means for comparing each value of said retried signal patterns with at least one threshold value;

counter means having an output which is set responsive to said comparing means indicating that a present value of the sequence of signal patterns has traversed across any one of said at least one threshold value, for labelling each surface traversed in the single direction of said unidirectional sequence;

means for tessellating the output of said comparing means to generate polygonal surfaces which approximate an intersection of surfaces determined by said at least one threshold value; with voxel elements being defined by said grid;



means for indicating, for each of said polygonal surfaces, surface depth information as determined by said counter means;

display processor means receiving, from at least said tessellating means, the tessellated comparing means output and for converting said output to a display format; and

means for displaying surfaces determined by said at least one threshold value, said displaying means being driven by said display processor means.

4,879,669

SENSOR SIGNAL PROCESSOR

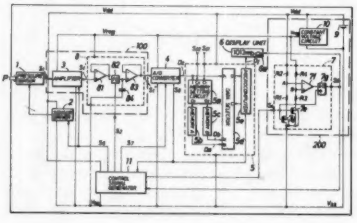
Hiroyuki Kihara, Kodaira, and Kazuya Mitaki, Hoya, both of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Mar. 16, 1988, Ser. No. 168,728

Claims priority, application Japan, Mar. 17, 1987, 62-61870; Oct. 23, 1987, 62-266311

Int. Cl.[4] G06F *15/20*; G04B *17/20, 9/00*

U.S. Cl. 364—550 **6 Claims**



1. A sensor signal processing apparatus comprising:

a power source unit including,

a battery,

a constant voltage circuit powered by said battery for supplying a constant voltage, and

a voltage detector for detecting a voltage drop in said battery having a comparator for comparing a terminal voltage of said battery with the voltage supplied by said constant voltage circuit;

a sensor for detecting physical information;

an analog signal processor for inputting and processing a sensor signal output from said sensor which is driven by said constant voltage circuit;

an A/D converter for converting the sensor signal, processed by said analog signal processor, into digital information data output and which is driven by said constant voltage circuit;

a data processor for generating sensor information data from the digital information data output from said A/D converter including,

first and second memories for storing first and second digital information data output from said A/D converter, respectively,

sensor characteristic calculating means for calculating a sensor characteristic equation on the basis of the first and second digital information data stored in said first and second memories and converting the digital information data output from said A/D converter into the sensor information data by applying the sensor characteristic equation calculated by said sensor characteristic calculating means to the digital information data, and

a control signal generator for generating control signals for controlling operations of said power source unit, said sensor, said analog signal processor, said A/D converter, and said data processor.

4,879,670

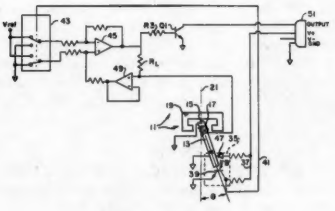
VEHICLE WHEEL ALIGNMENT TRANSDUCER, SYSTEM AND METHOD

Nicholas J. Colarelli, III, St. Louis County, Mo., assignor to Hunter Engineering Company, Bridgeton, Mo.

Filed Nov. 2, 1987, Ser. No. 115,117

Int. Cl.[4] G01B *7/00*

U.S. Cl. 364—559 **43 Claims**



4. An apparatus for measuring an alignment characteristic of a vehicle wheel comprising:

a transducer mountable in a fixed geometrical relationship with respect to a vehicle wheel, said transducer including means responsive to an alignment characteristic of the vehicle wheel for generating a digital signal having a duty cycle related to the value of the alignment characteristic being measured; and

means responsive to the duty cycle of the digital signal for determining the value of the alignment characteristic;

said transducer including a movable arm drivable along its path of travel to a first predetermined position, said arm being subjected by gravity to a force tending to make the arm move towards a vertical reference, the magnitude of the force being a function of the alignment characteristic of the vehicle wheel being measured.

4,879,671

DIGITAL MEASUREMENT OF RELATIVE DISPLACEMENT USING STORED CORRECTION ADDRESS DATA

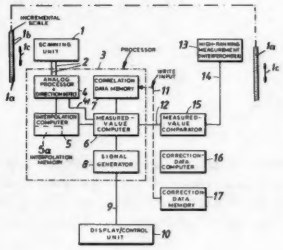
Heinz Rieder, St. Pantaleon, and Max Schwaiger, Ostermiething, both of Austria, assignors to RSF - Elektronik Gesellschaft m.b.H., Tarsdorf, Fed. Rep. of Germany

Continuation of Ser. No. 96,252, Sep. 8, 1987, abandoned, which is a continuation of Ser. No. 750,528, Jun. 28, 1985, abandoned. This application Nov. 14, 1988, Ser. No. 273,171

Claims priority, application Austria, Jul. 3, 1984, 2139/84

Int. Cl.[4] G01B *11/02, 21/02;* **G01C** *25/00;* **G06F** *11/00*

U.S. Cl. 364—562 **8 Claims**



1. A method of digitally measuring displacement increments with automatic correction which comprises the steps of:

(a) relatively displacing a scale having periodically repeating graduations separated by fixed increments and a scanner responsive to said scale and determining locations along said scale at which correction increments for measured displacement are necessary for respective positions of relative displacement of said scanner and said scale which exceed a predetermined threshold measurement error;

(b) storing in a correction data memory addresses corresponding to said locations of necessary scale correction increments for measured displacement which exceed said predetermined threshold measurement error at respective addresses for the scale locations corresponding to said positions and storing a plus or a minus sign for each said scale correction increment representing whether said scale correction increment lies respectively above or below a measured displacement by providing a respective plus and a respective minus address memory and storing each said correction address only in the plus address memory when said scale correction increment lies above said measured displacement and only in the minus address memory when said scale correction increment lies below said measured displacement;

(c) following said correction determination, displacing said scale and said scanner relatively and generating signals representing the latter relative displacement and movement past said locations;

(d) generating from said signals an output value corresponding to the successive scanning of said graduations, thereby forming a succession of measured values associated with successive locations of the scale which are scanned;

(e) reading from said correction data memory addresses corresponding to respective scale correction increments stored for each said scale location at which the respective scale correction increment exceeded said predetermined threshold measurement error;

(f) correcting said respective scale correction increments for a particular said address for a respective location, the corresponding measured value; and

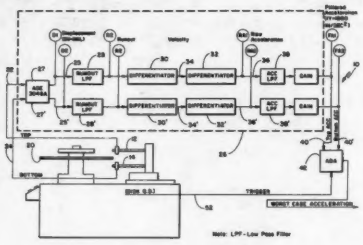
(g) outputting the measured value of the displacement corrected as in step (f).

4,879,672

METHOD AND APPARATUS FOR TESTING RUNOUT VELOCITY AND ACCELERATION ON A SURFACE

Philip R. Pombrio, Jr., Papillion, Nebr., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Aug. 21, 1987, Ser. No. 87,837
Int. Cl.[4] G01P 3/44; G01B 21/30
U.S. Cl. 364—566 10 Claims



1. A method for testing a surface for the largest acceleration associated with an irregularity on the surface from a signal representing the displacement between a fixed probe and the surface passing beneath the probe, said method comprising the steps of:

producing a plurality of data points representative of substantially instantaneous acceleration of the displacement over time between the fixed probe, and the surface passing under the probe;

transforming said plurality of data points into an exponential distribution curve;

determining the largest acceleration associated with an irregularity on the surface from said exponential distribution curve; and

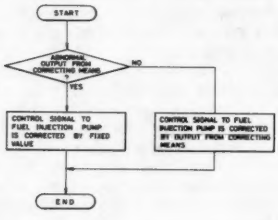
comparing the determined largest acceleration associated with an irregularity on a surface to a selected level of acceleration.

4,879,673

METHOD AND DEVICE FOR CORRECTING A FUEL INJECTION QUANTITY IN A DIESEL ENGINE

Masaomi Nagase; Yoshiyasu Ito; Mikio Kizaki; Kiyotaka Matsuno, all of Toyota; Keisuke Tsukamoto, Nagoya, and Fumiaki Kobayashi, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Jul. 21, 1986, Ser. No. 887,659
Claims priority, application Japan, Jul. 25, 1985, 60-164963
Int. Cl.[4] G06F 15/20; F02M 39/00
U.S. Cl. 364—571.01 7 Claims


START
ABNORMAL OUTPUT FROM CORRECTING MEANS ?
NO
YES
CONTROL SIGNAL TO FUEL INJECTION PUMP IS CORRECTED BY FIXED VALUE
CONTROL SIGNAL TO FUEL INJECTION PUMP IS CORRECTED BY OUTPUT FROM CORRECTING MEANS
END

1. A method of correcting a fuel injection quantity in a diesel engine, comprising correcting a shift in an engine rotation pulse and dispersion of responses of an electromagnetic spill valve by correcting means which provide a fixed output, correcting a control signal to a fuel injection pump in response to said fixed output from said correcting means,

detecting abnormal outputs from said correcting means; and

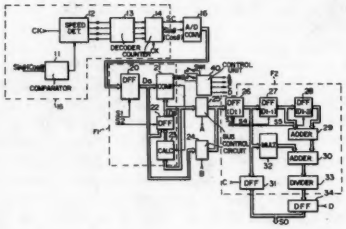
correcting a control signal to said fuel injection pump by use of a fixed value when the output from said correcting means is abnormal.

4,879,674

INPUT CIRCUIT FOR A DIGITAL PHASE LOCKED LOOP

Kenzaburou Iijima, and Yoshinori Hayashi, both of Shizuoka, Japan, assignors to Yamaha Corporation, Japan

Filed Jan. 14, 1988, Ser. No. 143,964
Claims priority, application Japan, Jan. 16, 1987, 62-7904
Int. Cl.[4] G06F 15/31
U.S. Cl. 364—724.03 2 Claims



1. An input circuit for a digital phase locked loop circuit, the input circuit comprising;

an A/D converter having means to receive an input signal;

a first filter coupled to said A/D converter and performing a first calculation $(D_{k-1}+1)$ when D_k is larger than D_{k-1}, a second calculation $(D_{k-1}-1)$ when D_k is smaller than D_{k-1}, and a third calculation (D_{k-1}) when D_k is equal to D_{k-1}, wherein D_k and D_{k-1} are current and one-time previous values of a first output signal from said A/D converter;

a second filter coupled to said A/D converter via said first filter and performing a fourth calculation $(2 \cdot D_t+D_{t-1}+D_{t-2})/4$, wherein D_t, D_{t-1} and D_{t-2} are current, one-time previous and two-times previous values of a second output signal from said A/D converter; and

means for selectively transferring a signal to the digital phase locked circuit after either said calculation by said first filter, after said calculation by second filter, or after said calculations by both said first and second filters.

4,879,675

PARITY GENERATOR CIRCUIT AND METHOD

Timothy B. Brodnax, Arlington, Va., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 17, 1988, Ser. No. 156,626
Int. Cl.[4] G06F 11/10
U.S. Cl. 364—738 10 Claims

1. An improved parity generator for the sum output of an adder having a first input operand A with M high order bits AH and N low order bits AL and a second input operand B having M high order bits BH and N low order bits BL, where A and B are to be added and the sum of which is to have its parity established, comprising:

an M bit adder having a first M bit operand AH and a second M bit operand BH and producing an M bit high order sum SH';

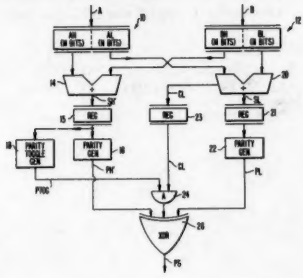
a first parity generator connected to the sum out of said M bit adder for producing a high order parity bit PH';

a parity toggle means having an input connected to the sum output of said M bit adder for producing a parity toggle bit having a binary value of one if there are an even num-

ber of ones to the right of the first zero in the sum output of said M bit adder or alternately producing a parity toggle bit having a binary value of zero if there are an odd number of ones to the right of the first zero in the sum output of said M bit adder;

an N bit adder having said N bit value AL applied as a first operand input thereto and having said N bit value BL applied as a second operand input thereto and producing an N bit low order sum SL and a low order carry bit CL;

a second parity generator having an input connected to said sum output of said N bit adder, for producing a low order parity bit PL;



an ANDing means having a first input connected to said parity toggle bit output from said parity toggle means and a second input connected to said low order carry bit CL output from said N bit adder, and having an output;

an exclusive ORing means having a first input connected to said output of said ANDing means, a second input connected to said high order parity bit PH' from said first parity generator and a third input from said low order parity bit PL from said second parity generator, the output of said exclusive ORing means being the parity of the sum of the operand A and B;

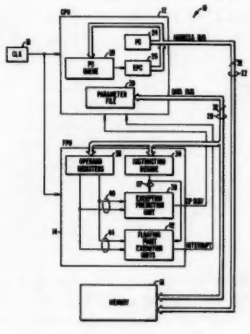
whereby the parity of the sum of two operands is produced.

4,879,676

METHOD AND APPARATUS FOR PRECISE FLOATING POINT EXCEPTIONS

Craig C. Hansen, Mountain View, Calif., assignor to MIPS Computer Systems, Inc., Sunnyvale, Calif.

Filed Feb. 29, 1988, Ser. No. 161,543
Int. Cl.[4] G06F 7/48
U.S. Cl. 364—748 **6 Claims**



1. In a data processing system of the type having at least a pair of processor units, a one of processor units being operable to perform floating point computations on first and second operands, each having an exponent field and a fractional field, the other processor units being operable to perform other data processing tasks in parallel with floating point computations being performed by the one processor unit, a method of performing floating point computations, the method comprising the steps of:

forming, for each different type of floating point computation to be performed by the one processor unit, floating point exception causing criteria;

comparing a combination of the exponent fields of the first and the second operands to the floating point exception causing criteria for the floating point computation to be performed;

generating a floating point exception prediction signal when the comparing step indicates, pursuant to the criteria used, the possibility that an exception will occur;

temporarily halting operation of the other processor unit in response to existence of the floating point exception prediction signal;

performing the floating computation; and

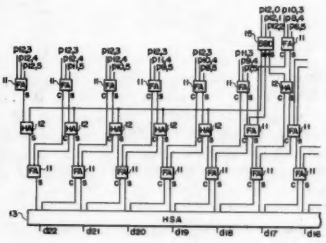
resuming operation of the other processor unit if the computation does not result in an actual floating point operation.

4,879,677

PARALLEL ADDER CIRCUIT WITH SIGN BIT DECODER FOR MULTIPLIER

Mikio Shiraishi, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 21, 1988, Ser. No. 171,105
Claims priority, application Japan, Mar. 30, 1987, 62-76647
Int. Cl.[4] G06F 7/52
U.S. Cl. 364—760 **15 Claims**



1. In a multiplier for determining the product of a multiplier and a multiplicand using Booth's algorithm and for producing a series of partial products in 2's complement format, each of the partial products containing a sign bit, a parallel adder circuit comprising:

sign bit decoder means, connected to receive said sign bits of at least two of said partial products, for generating outputs; and

partial product adding means, coupled to receive said partial products and the output of said sign bit decoder means, for producing the product of said multiplier and multiplicand, said partial product means including a plurality of bit adding means for producing different bits of said product, each of said bit adding means being coupled to receive corresponding bits of said partial products, and selected ones of said bit adding means being coupled to receive at least one of the outputs of said sign decoding means,

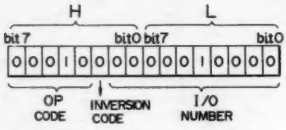
wherein said sign bit decoder means is connected to receive two sign bits A and B and produce two single bit outputs S (=A⊕B) and N (=A+B).

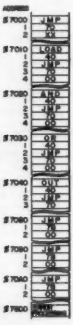
4,879,678

PROGRAMMABLE SEQUENCE CONTROLLER WITH OPERATION CODES PARTIALLY SUPPLYING JUMP TO ADDRESSES OF MACHINE LANGUAGE INSTRUCTION

Naohiro Kurokawa, and Ryoichi Abe, both of Shibata, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 15, 1985, Ser. No. 702,264
Claims priority, application Japan, Mar. 26, 1984, 59-58056
Int. Cl.[4] G06F *9/22, 11/16, 9/30, 9/32*
U.S. Cl. 364—900 **6 Claims**





1. A programmable sequence controller, comprising:

first read/write memory means for storing therein a sequence program provided by the user and including a combination of sequence instructions having different operation codes corresponding to different functions;

second memory means storing therein a plurality of different machine language instructions, corresponding to said different functions of said sequence instructions, at addresses that are an arithmetic combination of a single number and said operation codes of said sequence instructions respectively;

said second memory means storing therein, at a head address, a head jump instruction with a non-designated jump-to address;

said second memory means storing therein a jump to said head address as a terminal part of each of said machine language instructions;

processing means for processing said sequence program on the basis of said machine language instructions fetched from said second memory means to produce operation results; and

instruction transfer means for reading out the sequence instruction to be executed from said first memory means and transferring the operation code of the sequence instruction to be executed to said processing means as part of the jump-to address of said head jump instruction;

said processing means executing said head jump instruction with the jump-to address that is the arithmetic combination of said single number and said operation code of the sequence instruction to be executed to jump to and execute the machine language instruction corresponding to the sequence instruction to be executed;

input means for transferring input signals from outside the controller into said processing means;

output means for transferring an operation result of said processing means to external equipment; and

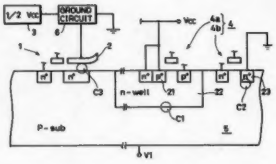
address bus means and data bus means interconnecting said first and second memory means, said processing means, said instruction transfer means, said input means, and said output means.

4,879,679

DYNAMIC RANDOM ACCESS MEMORY HAVING STORAGE GATE ELECTRODE GROUNDING MEANS

Shigeru Kikuda, and Hiroshi Miyamoto, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 2, 1988, Ser. No. 163,017
Claims priority, application Japan, Jun. 11, 1987, 62-147251
Int. Cl.[4] G11C *11/24, 11/34;* **H01L** *29/78;* **H03K** *3/01*
U.S. Cl. 365—149 **5 Claims**



1. A dynamic random access memory device provided on a semiconductor substrate, comprising:

a memory cell including a capacitor for storing electric charges as information, said capacitor having a storage gate electrode to which a potential other than a ground potential is applied when said device is in normal operation;

a peripheral circuit including a CMOS circuit; and

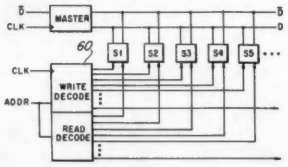
grounding means responsive to the voltage appearing at a power supply connection, and including switching means for applying the ground potential to said storage gate electrode only in a predetermined period immediately after a start of application of a power supply voltage to said device.

4,879,680

MULTI-SLAVE MASTER-SLAVE FLIP-FLOP

Dirk R. Luckett, Dallas, Tex., and James P. Parkerson, Portland, Me., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 18, 1985, Ser. No. 789,285
Int. Cl.[4] G11C *7/00, 19/00, 19/28*
U.S. Cl. 365—154 **4 Claims**



1. A multiple slave master-slave flip-flop, comprising:

a flip-flop master cell having a data input and a clock input;

a plurality of single-bit flip-flop slave cells connected in parallel and each coupled to said master cell;

each of said slave cells including address input means; each of said slave cells being responsive to a write signal, a

predetermined address on said address input means and both a data input and clock input at said flip-flop master to store said data therein; each of said slave cells being responsive to a read signal and said predetermined address on said address input means to read out therefrom data stored therein

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4,879,681

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

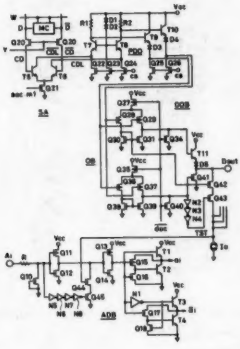
Hideo Miwa, Kodaira; Kazuhiro Tsuruoka, Tokyo; Koudou Yamauchi; Hitoshi Endoh, both of Ohme, and Masanori Odaka, Kodaira, all of Japan, assignors to Hitachi, Ltd. and Hitachi VLSI Engineering Corp., both of Tokyo, Japan

Continuation of Ser. No. 137,734, Dec. 24, 1987. This application Jan. 5, 1989, Ser. No. 293,760

Claims priority, application Japan, Dec. 24, 1986, 61-306462

Int. Cl.[4] G11C *13/00*

U.S. Cl. 365—189.01 **34 Claims**



1. A semiconductor integrated circuit device comprising:

external input terminals to which external input signals are to be supplied;

a first input circuit connected to said external input terminals and generating internal signals in accordance with said external input signals;

an internal circuit connected to said first input circuit and generating internal output signals in response to said internal signals;

an output circuit having input nodes connected to said internal circuit and an output node connected to an external terminal, and generating an external output signal in accordance with said internal output signals;

a first power source wiring connected to said first input circuit and supplying a predetermined power source voltage;

control means connected to said output circuit, for controlling said output circuit so that the output node of said output circuit attain a high impedance state; and

input circuit control means connected to said first input circuit, for detecting a change of the output node of said output circuit to the high impedance state by said control means in a transition period in which a potential of said external output signal generated by said output circuit changes, and for changing a threshold voltage of said first input circuit based on the detected change.

4,879,682

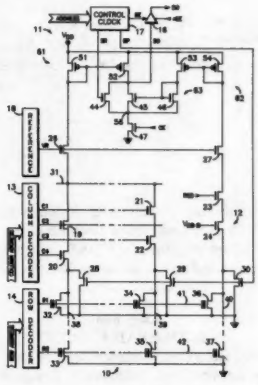
SENSE AMPLIFIER PRECHARGE CONTROL

Bruce E. Engles, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 15, 1988, Ser. No. 244,368

Int. Cl.[4] G11C *13/00*

U.S. Cl. 365—189.01 **15 Claims**



12. A memory comprising:

an array comprised of word lines, bit lins, and memory cells, wherein the word lines and bit lines intersect and the memory cells are located at the intersections of the bit lines and word lines, each memory cell is in either a first or second state, each memory cell draws current representative of its state;

sense amplifier means having a first input and a second input for comparing current drawn from said first input to the current drawn from said second input and providing an output signal;

decoder means for selectively coupling one of said bit lines to the first input of said sense amplifier;

a plurality of first transistors, each of said first transistors coupled to a respective bit line and enabled by a precharge signal being active, each of said first transistors having a first gain;

a reference bit line;

a second transitor coupled to said reference bit line, enabled by said precharge signal being active, and having a second gain, said second gain greater than said first gain;

coupling means for coupling the reference bit line to the second input of the sense amplifier in response to a reference signal becoming active, said reference signal becoming active a predetermined time period after the precharge signal is no longer active.

4,879,683

A GAAS REGISTER FILE HAVING A PLURALITY OF LATCHES

Virgilio N. Garcia, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 28, 1987, Ser. No. 101,620

Int. Cl.[4] G11C *7/00;* **H03K** *19/094*

U.S. Cl. 365—189.05 **6 Claims**

1. A GaAs register file comprising:

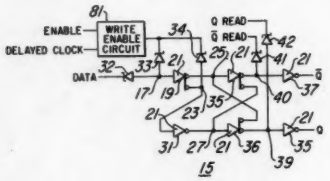
a plurality of latches, each latch having a data input terminal and a write enable circuit having a write enable strobe connected thereto, said write enable circuit comprising:

a first input circuit including at least a single GaAs gate with an input and at least a first and second output;

a second input circuit including at least a single input gate with an input and a first output;

a first combining circuit with inputs connected to the first outputs of the first and second circuits and including an output;

a plurality of series connected GaAs gates having an input and an output with an input being connected to a second output of the first input circuit; and



a second combining circuit with inputs connected to an output of the first combining circuit and the output of the plurality of series connected GaAs gates and having its output connected to the write enable strobe.

4,879,684

WRITE-READ CIRCUIT

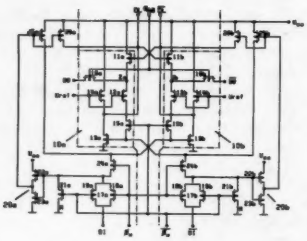
Mathias Krauss, and Horst-Guenter Schniek, both of Dresden, German Democratic Rep., assignors to Jenoptik Jena GmbH, Jena, German Democratic Rep.

Filed Mar. 16, 1988, Ser. No. 168,842

Claims priority, application German Democratic Rep., Apr. 16, 1987, 3018814

Int. Cl.[4] G11C *7/00*

U.S. Cl. 365—189.11 **5 Claims**



1. In a read-write circuit for a CMOS memory connected to the read-write circuit via first and second data memory lines and two selector transistors, the memory being controlled by a bit line decoder and having one pair of bit lines each connected to a sensor flip-flop, the read-write circuit being furthermore connected by first and second data input lines to a data input buffer and being connected by first and second data output lines to a data output driver, the read-write circuit including first and second read circuits associated with said first and second data memory lines, respectively, the improvement wherein the first and second data input lines are connected by first and second transfer gates to the inputs of first and second inverters and via first and second n-transistors, respectively, to the gates of third and fourth low-resistance n-transistors in the second and first read circuits, respectively, first and second low-resistance p-transistors being connected to the outputs of the first and second inverters, respectively, for connecting a supply voltage to the first and second data memory lines, respectively, and wherein fifth and sixth n-transistors are connected between the inputs of the first and second inverters and a ground reference, and further comprising means for rendering said first and second transfer gates conductive and rendering said fifth and sixth n-transistors non-conductive during writing to said memory.

4,879,685

SEMICONDUCTOR MEMORY DEVICE WITH INTERNAL ARRAY TRANSFER CAPABILITY

Yoshihiro Takemae, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

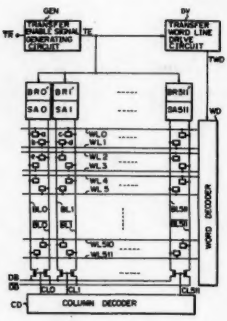
Continuation of Ser. No. 786,250, Dec. 18, 1985, abandoned.

This application Feb. 16, 1989, Ser. No. 311,367

Claims priority, application Japan, Oct. 15, 1984, 59-215866

Int. Cl.[4] G11C *7/00, 11/40*; G09G *1/14*

U.S. Cl. 365—189.11 **10 Claims**



1. A semiconductor memory device, comprising:

a plurality of word lines;

a plurality of bit lines;

a memory cell array, including:

a plurality of memory cells connected between said word lines and said bit lines at intersections of said word lines and bits lines; and

a plurality of sense amplifiers, each connected to a pair of bit lines, for amplifying a difference in potential between respective said bit lines;

a plurality of bit line reset means, each connected to a pair of said bit lines, for resetting all said bit lines to a reset potential both before and after a read/write cycle; and

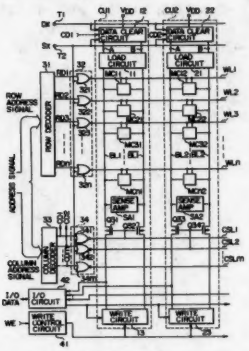
transfer control means for arbitrarily selecting a first word line and thereafter selecting a second word line, and for simultaneously reading out data in each memory cell within the array connected to said first word line to each bit line and thereafter simultaneously writing data in each bit line amplified by said sense amplifier to each corresponding memory cell within the array connected to said second word line and producing a parallel data transfer, within the array, from memory cells corresponding to the first word line to memory cells corresponding to the second word line, said transfer control means including inhibit means, connected to said bit line reset means, for inhibiting resetting of said bit lines during the parallel data transfer, directly writing potentials developed on said bit lines during the reading out into memory cells connected to said second word line during the writing.

4,879,686

SEMICONDUCTOR MEMORY DEVICE WITH A DATA CLEAR CIRCUIT

Azuma Suzuki, Yokohama; Takayuki Ootani, Tokyo, and Mitsuo Isobe, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Mar. 3, 1988, Ser. No. 163,750
Claims priority, application Japan, Mar. 6, 1987, 62-51354
Int. Cl.[4] G11C 7/00, 11/40
U.S. Cl. 365—189.11 12 Claims



1. A semiconductor memory device comprising:

a memory cell array having a plurality of memory cells;

bit line means having a pair of first and second bit lines connected to a number of specified memory cells of said memory cell array;

mode-selecting means for selecting one of a first mode and a second mode;

memory cell-selecting means for driving one of the specified memory cells when set in the first mode, and for driving all specified memory cells when set in the second mode;

input data supply control means for supplying externally input data to the bit lines when set in the first mode, and for supplying no data to the bit lines when set in the second mode; and

bit-line potential control means connected to said first and second bit lines for raising the potential of the first and second bits lines to a high level when set in the first mode, and for raising the potential of the first bit line to the high level and lowering the potential of the second bit line to a low level when set in the second mode.

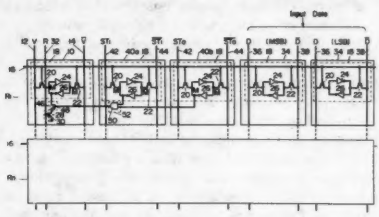
4,879,687

MEMORY DEVICE HAVING VALID BIT STORAGE UNITS TO BE RESET IN BATCH

Tadashi Okamoto, Hirakata; Hiroshi Kadota, Toyonaka; Jiro Miyake, Moriguchi; Ichiro Okabayashi, and Yoshinori Maeda, both of Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 8, 1987, Ser. No. 59,763
Claims priority, application Japan, Jun. 13, 1986, 61-138529
Int. Cl.[4] G11C 7/00, 11/40
U.S. Cl. 365—200 5 Claims

1. A memory device comprising plural word data storage units, each word data storage unit having plural data bit cells for storing word data, a plurality of status bit cells for indicating the status of said data, and a valid bit cell storing valid bits for indicating the validity of said data, said valid bit cell having a reset circuit, and said reset circuit being connected to one reset line and connected to a status setting circuit capable of operating the reset circuit only when the outputs of status bit cells having a specified status, whereby only the valid bit cell of the word data storage unit in which the output of status bit cell has a specified status when a reset signal is applied to one reset line being reset in batch, said reset circuit comprising first and second switches composed of transistors for connecting in series between a portion holding the data of memory cells of



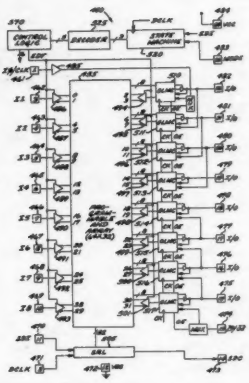
said valid bits and a constant potential portion; wherein said status setting circuits disposed on all words receive outputs from said status bits on individual words to generate an output used as the input to said first switch, and wherein said one reset line is used as an input to said second switch for all words.

4,879,688

IN-SYSTEM PROGRAMMABLE LOGIC DEVICE

John E. Turner; David L. Rutledge, both of Beaverton, and Roy D. Darling, Forest Grove, all of Oreg., assignors to Lattice Semiconductor Corporation, Hillsboro, Oreg.

Continuation-in-part of Ser. No. 707,662, Mar. 4, 1985, Pat. No. 4,761,768. This application May 13, 1986, Ser. No. 862,815
Int. Cl.[4] H03K 19/77; G06F 11/26
U.S. Cl. 365—201 42 Claims



1. An integrated in-system programmable logic device, operable during a normal device operating state to receive logical input signals and provide output signals in dependence on predetermined logic functions implemented by selective connection of input lines to product term lines, comprising:

a first set of device input terminals dedicated to receiving input logical data;

a second set of device terminals dedicated to the function of receiving input logical data or providing output logical data;

a programmable array, said array including a plurality of input lines, a plurality of product term lines and a plurality of output lines, said input lines being coupled to respective ones of said device input terminals;

said programmable array comprising an array of nonvolatile memory cells arranged in rows and columns, each cell

associated with predetermined ones of said input lines and said product term lines and arranged to selectively connect said input line to said product term line in dependence on the cell state, each cell comprising a cell selection element and an electrically erasable and reprogrammable nonvolatile memory element which retains a selected cell state upon interruption of device power;

a first device utility terminal dedicated for device utility functions;

data receiving means for receiving cell selection data and row programming data through said first device utility terminal during a device utility state;

means for programming the cells of said array to predetermined conditions in dependence on said cell selection and programming data during said utility state; and

means for isolating said first set of device input terminals from said array and from said programming means during said utility state;

whereby said device may be programmed to a desired configuration during said utility state while installed in a user's system without the necessity for voltage and timing requirements on said input terminals.

4,879,689

NONVOLATILE SEMICONDUCTOR MEMORY DEVICE

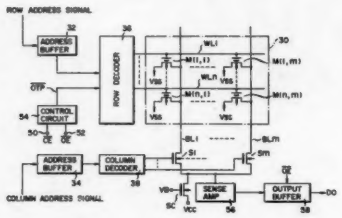
Shigeru Atsumi; Sumio Tanaka, both of Tokyo; Shinji Saito, and Nobuaki Otsuka, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 25, 1987, Ser. No. 30,065

Claims priority, application Japan, Mar. 31, 1986, 61-71139

Int. Cl.[4] G11C *11/40, 29/00*

U.S. Cl. 365—201 **12 Claims**



1. A nonvolatile semiconductor memory device comprising:

a memory cell array including a plurality of memory cells which are each formed of a nonvolatile transistor;

a plurality of word lines each connected to the memory cells in the same row;

a plurality of bit lines each connected to the memory cells in the same column;

first selecting means connected to receive an address signal for selecting one of said word lines in accordance with said address signal and driving the memory cells connected to the selected word line;

second selecting means connected to receive said address signal for selecting one of said bit lines in accordance with said address signal and supplying a predetermined voltage to the selected bit line;

output means connected to said bit lines for supplying output data corresponding to the potential of the selected bit line;

a control terminal for receiving a control signal of first and second levels; and

control means coupled to said control terminal for generating a selection control signal prohibiting the selecting operation of said first selecting means in response to the control signal of said first level and permitting the selecting operation in response to the control signal of said second level, said second selecting means being capable of selecting said one of said bit lines at times when said selection control signal is generated.

4,879,690

STATIC RANDOM ACCESS MEMORY WITH REDUCED SOFT ERROR RATE

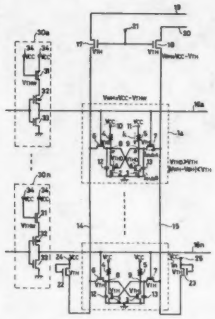
Kenji Anami; Katsuki Ichinose, and Tomohisa Wada, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 11, 1988, Ser. No. 231,063

Claims priority, application Japan, Sep. 7, 1987, 62-223299; Sep. 25, 1987, 62-242308; Jun. 10, 1988, 63-144320

Int. Cl.[4] G11C *13/00*

U.S. Cl. 365—201 **22 Claims**



1. A static random access memory having a reduced soft error rate, comprising:

a plurality of word lines,

a plurality of bit line pairs arranged intersecting with said plurality of word lines,

a plurality of memory cells each connected to an intersection of each of said word lines and each of said bit line pairs,

a potential source for generating a power-supply potential and a ground potential, and

word line selecting means for selecting a single word line from among said plurality of word lines and applying a predetermined potential to the word line,

each of said memory cells comprising

a first load element having one terminal coupled to said power-supply potential and another terminal in which information of a low or high level is stored,

a second load element having one terminal coupled to said power-supply potential and another terminal in which information of a high or low level is stored,

a first information storing transistor element connected between the other terminal of said first load element and said ground potential and having a control terminal connected to the other terminal of said second load element,

a second information storing transistor element connected between the other terminal of said second load element and said ground potential and having a control terminal connected to the other terminal of said first load element,

a third accessing transistor element connected between one of each of said bit line pairs and the other terminal of said first load element and having a control terminal connected to a corresponding one of said word lines, and

a fourth accessing transistor element connected between the other of each of said bit line pairs and the other terminal of said second load element and having a control terminal connected to a corresponding one of said word lines,

said third and fourth accessing transistor elements having a first threshold voltage, and

potential establishing means for setting the potential difference between a potential on the word line selected by said word line selecting means and a potential on a bit line to which information of a high level is read out at the time of selecting the word line to be smaller than said first threshold voltage of said third and fourth transistor elements so that soft errors are reduced.

4,879,691

OPTICAL RECORDING SYSTEM WITH OPTICAL RECORDING MEDIUM HAVING MULTILEVEL RECORDING SURFACE FOR TRACKING

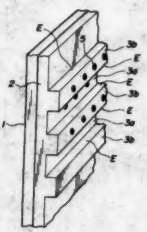
Hidefumi Suzuki, Tokyo, Japan, assignor to CSK Corporation, Tokyo, Japan

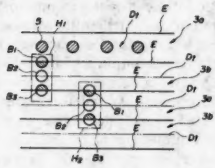
Continuation of Ser. No. 99,002, Sep. 21, 1987, abandoned. This application Jan. 19, 1989, Ser. No. 300,258

Claims priority, application Japan, Sep. 20, 1986, 61-222724; Sep. 20, 1986, 61-222725

Int. Cl.[4] G11C *7/00, 13/04, 13/00*

U.S. Cl. 365—215 **28 Claims**





1. An optical recording system comprising an optical recording medium and means for reading data from said optical recording medium,

said optical recording medium including a data recording region having a face formed on a substrate in a stepped configuration comprising adjacent elongated recessed surface portions and elongated raised surface portions, each said recessed and raised surface portions parallel to a major surface of said substrate, said recessed surface portions and said raised surface portions positioned at respective different heights relative to said major surface of said substrate and alternately arranged across said recording region, said recessed surface portions and said raised surface portions each providing a data track, a boundary edge between any two adjacent recessed and raised surface portions forming a tracking line,

said data recording means having an optical system including a read head for reading data from said data track of said optical recording medium, and tracking means for detecting said boundary edge between recessed and raised portions of said optical recording medium and positioning said read head in response thereto.

28. An optical recording system including means for reading data from an optical recording medium and means for reading data from said optical recording medium, said optical recording medium having a data recording face, which comprises recessed and raised portions formed on said data recording face arranged alternately and both extending in a data reading/writing direction providing data tracks; and boundary edges formed and defined between respective adjacent raised portions, which edges extend along the data tracks and form tracking lines, said data reading means including means responsive to the boundary edges as tracking lines for tracking said data tracks while reading data from said medium.

4,879,692

DYNAMIC MEMORY CIRCUIT WITH IMPROVED SENSING SCHEME

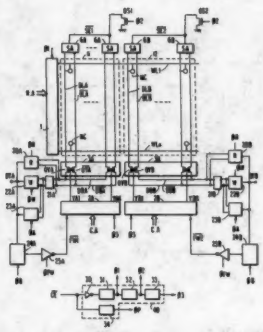
Kazuo Tokushige, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 6, 1988, Ser. No. 202,847

Claims priority, application Japan, Jun. 4, 1987, 62-140811

Int. Cl.[4] G11C *8/00, 7/00*

U.S. Cl. 365—230.03 **4 Claims**



1. A dynamic memory circuit comprising first and second memory arrays, each of said first and second arrays including a plurality of word lines arranged in rows, a plurality of digit lines arranged in columns normal to the direction of said rows of word lines, and a plurality of memory cells arranged in a matrix of rows and columns and coupled to said word lines and said digit lines, a row selection circuit coupled to the word lines of said first and second memory arrays for operatively selecting one of the word lines of said first memory array and one of the word lines of said memory array simultaneously in response to row address information, a first data line, a plurality of first transfer gates connected between said first data line and the digit lines of said first memory array, a second data line, a plurality of second transfer gates connected between said second data line and the digit lines of said second memory array, a first data input circuit coupled to said first data line and operatively supplying a first input data signal thereto, a second data input circuit coupled to said second data line and operatively supplying a second input data thereto, a plurality of first sense amplifiers connected to the digit lines of said first memory array for operatively amplifying levels at the digit lines of said first memory array, a plurality of second sense amplifiers connected to the digit lines of said second memory array for operatively amplifying levels at the digit lines of said second memory array, first means for receiving a first control signal taking one of first and second levels, second means for receiving a second control signal taking one of the first and second levels, a first column decoder circuit coupled to said first transfer gates and said first means, said first column decoder enabling one of said first transfer gates when said first control signal is at said first level and enabling all of said first transfer gates when said first control signal is at said second level, a

second column decoder circuit coupled to said second transfer gates and said second means, said second column decoder enabling one of said second transfer gates when said second control signal is at said first level and enabling all of said second transfer gates when said second control signal is at said second level, a first sense control circuit coupled to said first sense amplifiers for enabling said first sense amplifiers simultaneously in response to a sense enable signal, and a second sense control circuit coupled to said second sense amplifiers for enabling said second sense amplifiers in response to said sense enable signal.

4,879,693

DEVICE FOR THE SELF-SYNCHRONIZATION OF THE OUTPUT CIRCUITS OF A MEMORY USING A THREE-STATE GATE

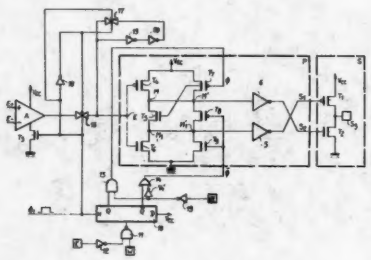
Richard Ferrant, Aix En Provence, France, assignor to SGS-Thomson Microelectronics S.A., Paris, France

Filed Dec. 3, 1987, Ser. No. 128,169

Claims priority, application France, Dec. 5, 1986, 86 17041

Int. Cl.[4] G11C *8/00*

U.S. Cl. 365—233 **9 Claims**



1. A self-synchronization device for output circuits of memories working in an internal clock mode, comprising a "3-state" gate connected to the output of read amplifiers, the working of said memories being monitored by read and operation control signals $\overline{W}$ and $\overline{E}$, said device comprising a sequential logic circuit which allows the "3-state" gate to go into low impedance only at the instant when a datum is available at the output of the read amplifiers.

4,879,694

DIFAR DEMULTIPLEXER CIRCUIT

Gilbert R. Grado, Tustin, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 4, 1988, Ser. No. 164,050

Int. Cl.[4] H04B *1/59*

U.S. Cl. 367—3 **6 Claims**

1. A demultiplexer circuit responsive to a composite input signal from a sonar bouy, said composite signal having signal components characterized as; a received audio signal having cosine and sine components, each component having an amplitude proportional to the amplitude of the received audio signal times the respective cosine and sine of the angle between the source of the audio signal and a frame reference referenced to the reference system of said sonar bouy receiving the audio signal, the cosine component being modulated by a reference carrier signal and the sine component being modulated by a quadrature reference carrier signal, said quadrature reference carrier signal being characterized as leading the reference carrier signal by 90 degrees;

a constant amplitude fixed frequency pilot having a frequency equal to one half the frequency of said reference carrier signal; and,

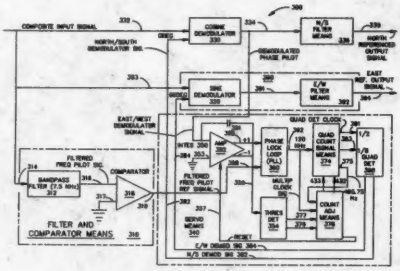
a constant amplitude phase pilot signal having a frequency equal to the frequency of said reference carrier signal, the phase pilot signal being phase shifted to lag the reference carrier signal by an angle equal to the sum of 90 degrees and an angle proportional to the heading angle measured between magnetic north and the reference axis of said reference frame;

the demultiplexer circuit providing a north referenced output signal proportional to the amplitude of the received audio signal times the cosine of the angle between magnetic north and the reference frame reference axis and an east referenced output signal proportional to the amplitude of the received audio signal times the sine of the angle between magnetic north and the reference frame reference axis;

said demultiplexer circuit comprising:

filter and comparator means responsive to said composite signal for providing a filtered frequency pilot reference signal having a frequency equal to one half the frequency of said reference carrier signal; and,

sine demodulator means responsive to said composite signal and to an east/west demodulator signal for providing said east referenced output signal;



cosine demodulator means responsive to said composite signal and to a north/south demodulator signal for providing a demodulated phase pilot signal and said north referenced output signal;

north/south filter means responsive to the output signals from said cosine demodulator means for filtering said demodulated phase pilot signal to provide said north referenced output signal;

a servo means responsive to said filtered frequency pilot reference signal and to said demodulated phase pilot signal for generating and controlling the phase of said north-/south demodulator signal and said east/west demodulator signal using a single phase locked loop, said servo means being characterized to phase shift said north/south and east/west demodulator signals to adjust the outputs of said sine and cosine demodulator means to remove all error bias from said demodulated phase pilot signal, said error bias being measured with respect to a reference potential such as ground.

4,879,695

METHOD OF LOCATING A MEMBER IN A BOREHOLE

Alan Meadows, Stretton, England, assignor to Coal Industry (Patents) Limited, London, England

Filed Dec. 9, 1988, Ser. No. 281,857

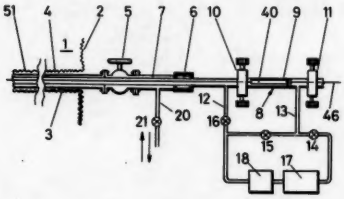
Claims priority, application United Kingdom, Jan. 28, 1988, 8801881

Int. Cl.[4] G01V *1/00*

U.S. Cl. 367—25 **17 Claims**

1. A method of locating a member in a borehole comprising the steps of inserting a tubular open ended casing into the borehole with part of the casing extending outside of the borehole, filling the borehole casing with a slow setting grout by pumping the grout down the centre of the casing until the

grout flows back out of an annulus formed between the outside of the casing and the borehole wall, fitting a breech assembly to the part of the casing extending beyond the borehole, inserting an anchor module connected to one end of a rope into the breech assembly pumping more grout into the casing so as to convey the anchor and the rope into the casing, connecting a



member to the rope, entering the member into the breech assembly and continuing pumping grout so as to convey the member with an attached signal cable into the casing, the pumping being continued until the anchor module passes from the distal end of the casing and is secured in the downhole end of the borehole.

4,879,696

METHOD AND APPARATUS FOR INITIATING SEISMIC DATA STORAGE IN AN ISOLATED DISTRIBUTED RECORDING SYSTEM

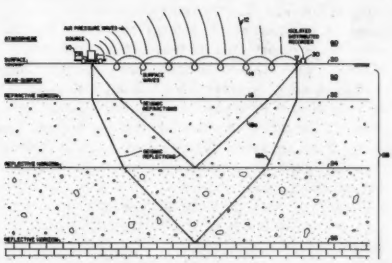
Richard J. Kostelnicek, Dickinson, and Raul R. Montes, Houston, both of Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Mar. 27, 1986, Ser. No. 845,156

The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.

Int. Cl.[4] G01V *1/22*

U.S. Cl. 367—76 **35 Claims**



1. A method for initiating seismic data storage in an Isolated Distributed Recording System, including the steps of:

(a) generating an encoded seismic signal, utilizing an acoustic energy source, which will penetrate to a sub-surface refractive horizon;

(b) detecting a refraction of said controlled seismic signal from the refractive horizon with at least one isolated distributed recorder;

(c) correlating said refracted seismic signal with a preselected correlating signal; and

(d) upon correlation between said correlating signal and said refracted seismic signal, triggering the isolated distributed recorder to store incoming seismic data.

4,879,697

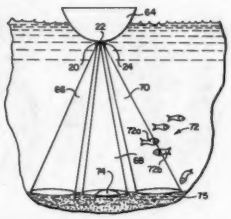
SONAR FISH FINDER APPARATUS PROVIDING SPLIT-SCREEN DISPLAY

Darrell J. Lowrance, Tulsa, and Ronald G. Weber, Owasso, both of Okla assignors to Lowrance Electronics, Inc., Tulsa, Okla

Filed Aug. 5, 1988, Ser. No. 228,680

Int. Cl.[4] G01S *15/96*

U.S. Cl. 367—111 **12 Claims**



1. A fish finder system for a boat and other watercraft for determining and displaying the location of fish or other targets in the body of water surrounding the boat, said system comprising:

electromechanical transducer means for transmitting sound waves into the body of water along three separate paths, substantially in the form of three closely spaced, conically shaped sound beams, respectively directed centrally under the boat and to left and right sides thereof into three corresponding areas of the body of water, for receiving corresponding echoes from obstructions in the paths of said sound waves including echoes from any fish in said paths and for generally electrical signals in accordance with the received echoes;

electrical transmitter means connected to said transducer means for controlling transmission of said sound waves by said transducer means;

receiver means connected to said transducer means for receiving and processing the electrical signals produced by said transducer means and for producing an output in accordance therewith;

microprocessor means connected to said receiver means for converting the output of said receiver means into electrical data representative of display images of the three areas of the body of water; and

visual display means, connected to said microprocessor means and including a screen, for simultaneously displaying images in the form of cross sections of the water in the three areas corresponding to said electrical data at three separate side by side locations on said screen to provide separate, simultaneous indications of the presence or absence of fish in the three areas.

4,879,698

PIEZOPOLYMER ACTUATORS

Edwin Langberg, Medford, N.J., assignor to Sensor Electronics, Inc., Mount Laurel, N.J.

Filed Nov. 3, 1988, Ser. No. 266,864

Int. Cl.[4] H04R *23/00*

U.S. Cl. 367—140 **13 Claims**

1. An actuator comprising

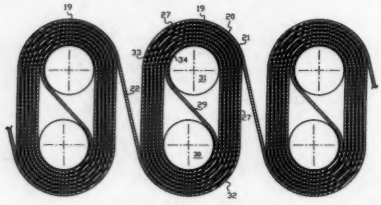
a base;

a first and a second pin made from electrically conducting material, said first pin and said second pin fastened parallel to each other at the base;

a means for applying a driving voltage to said pins at the base;

a winding, slidably disposed with respect to the pins, comprising a strip of piezopolymer film, said strip having a

distension direction coincident with an axis of the winding and said strip comprising a first electrode on a first face of said piezopolymer strip and a second electrode on a second face of said piezopolymer strip, said winding following a path between and around said first pin and said second pin, for providing a sliding surface contact between said first electrode and said first pin and between said second electrode and said second pin, whereby the



driving voltage applied thorough the pins and through a sliding contact between pins and the electrodes, to the electrodes, causes a distension of the piezopolymer winding with respect to and along the pins, said distension constituting a mechanical response of the actuator to the driving voltage; and

a means for coupling a mechanical load to the distension of the winding.

4,879,699

AUDIO OUTPUT DEVICE

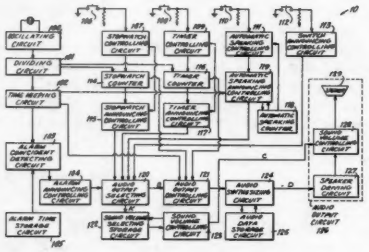
Yumi Sakamoto, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

Filed Sep. 23, 1988, Ser. No. 248,524

Claims priority, application Japan, Sep. 25, 1987, 62-241118; Apr. 13, 1988, 63-90999

Int. Cl.[4] G04B *21/08, 23/02*

U.S. Cl. 368—63 **63 Claims**



1. An audio output device, comprising:

selecting means for selecting among a group of audio functions including user requested time of day;

synthesizing means for producing audio data corresponding to the audio function selected;

sound volume means for producing a predetermined sound volume control signal corresponding to the audio function selected; and

audio output means for producing an audio output at a predetermined level of sound volume based on the audio data and sound volume control signal.

4,879,700

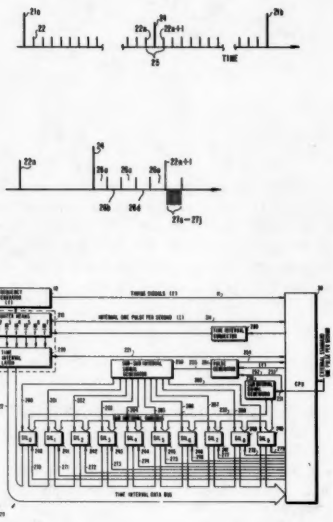
METHOD AND APPARATUS FOR DETERMINING THE TIME BETWEEN TWO SIGNALS

Alan D. MacIntyre, Irvine, Calif., assignor to Ball Corporation, Muncie, Ind.

Filed May 4, 1987, Ser. No. 45,355

Int. Cl.[4] G04F *8/00*

U.S. Cl. 368—117 **14 Claims**



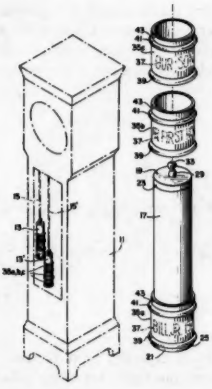
1. A time interval counter for determining the time interval between an external signal and one of a series of timed signals occurring at known time intervals, comprising:

first means, operated by the external signal, for producing a plurality of binary outputs spaced from each other by a plurality of known time intervals that are substantially less than the known time interval of the series of timed signals, said plurality of binary outputs forming a coded representation of the time interval following the external signal;

second means, operated by the timed signal following the external signal, for producing a plurality of sequential outputs spaced from each other by a plurality of known sub-time intervals that are substantially less than the known time intervals of the binary outputs of the first means; and

third means for storing the plurality of binary outputs and coded representations of the time interval after the external signal at each of the sub-time intervals produced by said second means, and for determining the time interval between the external signal and the timed signal following the external signal by decoding the stored binary outputs and coded representations of the time interval following the external signal, by comparing the stored coded representations of the time interval following the external signal at each of the sub-time intervals to determine the number of sub-time intervals represented by any change in the stored coded representations, and by combining the decoded time interval and number of sub-time intervals to determine the total time interval following the external signal.

4,879,701
MEMORIALIZED CASE CLOCKS
James H. Kelly, Pulaski, Va., assignor to Pulaski Furniture Corporation, Pulaski, Va.
Filed Sep. 6, 1988, Ser. No. 240,201
Int. Cl.[4] G04B *15/00*; G04C *21/00*
U.S. Cl. 368—136 14 Claims



1. In a case clock including a hanging generally elongated weight, an improvement for memorializing the same which comprises an ornamental annular band surrounding said weight over at least a portion of its length and supported thereby, said band carrying on an exterior surface thereof indicia commemorating an event to be memorialized.

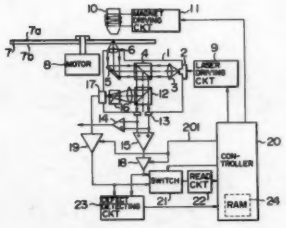
4,879,702
WRIST WATCH
Kenneth H. Gardner, P.O. Box 1276, Bridgetown, Barbados
Filed Jun. 22, 1988, Ser. No. 209,731
Claims priority, application United Kingdom, Jun. 26, 1987, 8715065
Int. Cl.[4] G04B *37/00*
U.S. Cl. 368—282 13 Claims

1. A wrist watch having a watch body and a flexible wrist band, the watch body

and wrist band being adapted, to hold the watch body at the side of a wear's wrist,

wherein the wrist band includes a closure means and a substantially flat relatively less flexible portion separated from the watch body by a flexible portion of the band, the less flexible portion extending over sufficient of the circumference of the band to lie on an elongate portion of the wearer's wrist to locate the watch body at the side of the wrist and to prevent rotation of the watch around the wrist.

4,879,703
MAGNETO-OPTIC MEMORY APPARATUS WITH DEFECT DETECTION OF RECORDING MEDIUM DURING ERASING OPERATION
Toshimitsu Kaku, Sagamihara; Yoshito Tsunoda, Mitaka, and Kazuo Shigematsu, Saitama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Jul. 8, 1987, Ser. No. 71,178
Claims priority, application Japan, Jul. 9, 1986, 61-159608
Int. Cl.[4] G11B *11/12*
U.S. Cl. 369—13 14 Claims



1. A magneto-optic memory apparatus comprising:

a recording medium having a perpendicular magnetic film;

illumination means for focusing a laser beam on said recording medium;

laser driving means for causing the intensity of said laser beam to correspond to a reproducing operation, a recording operation and an erasing operation;

magnetic field generating means for applying a magnetic field to said recording medium in recording and erasing periods;

driving means for driving said magnetic field generating means so that the magnetic field applied to said recording medium in the recording period is opposite in direction to the magnetic field applied to said recording medium in the erasing period;

first detection means for detecting a signal indicative of a reflected light quantity, by using reflected light from said recording medium;

second detection means for detecting a magnetization signal indicative of magnetization information recorded in said perpendicular magnetic film by using said reflected light;

variable gain amplifying means connected to at least one of said first and second detection means, the gain of said variable gain amplifying means in a reproducing period being made different from the gain of said variable gain amplifying means in the erasing period;

defect detecting means for detecting a defect on said recording medium on the basis of an output signal from said variable gain amplifying means during an erasing operation; and

control means for storing the position of a detect detected by said defect detecting means, and for controlling said laser driving means on the basis of stored position information to enable proper recording of data without requiring a read after write operation.

4,879,704

OPTICAL DISK, OPTICAL DISK RECORDING AND REPRODUCING APPARATUS AND COPY PREVENTIVE METHOD FOR OPTICAL DISKS

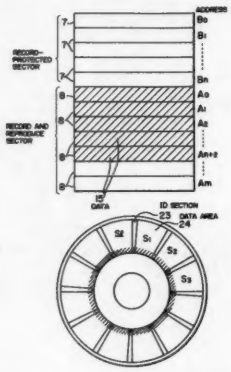
Yuuji Takagi, Kadoma; Isao Satoh, Neyagawa; Makoto Ichinose, Saksi; Yoshihisa Fukushima, Osaka, and Yuzuru Kuroki, Toyonaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jul. 16, 1987, Ser. No. 74,291

Claims priority, application Japan, Jul. 21, 1986, 61-171231

Int. Cl.[4] G11B *11/12, 23/28*

U.S. Cl. 369—14 **6 Claims**



1. An optical disk recording and reproducing apparatus for recording and reproducing data from an optical disk divided into a plurality of sectors each thereof being preliminarily formatted with an address with m and n each representing a given positive integer, said apparatus comprising:

means for only reproducing data from said optical disk sectors respectively designated by addresses B_0 to P_n; and

means for recording and reproducing data from said optical disk sectors respectively designated by addresses A_0 to A_m,

said sectors designated by said addresses B_0 to B_n serving as record-protected sectors and being adapted for the reproduction of data only irrespective of said optical disk comprising a read only-type optical disk, a DRAW-type optical disk or an erasable optical disk,

whereby data having at least part thereof recorded on said record protected sectors designated by said addresses B_0 to B_n is protected from being recorded on the same address sectors of another recordable optical disk.

4,879,705

AUTOMATIC LOADING DISC PLAYER

Yoshio Aoyagi, Kawagoe; Hiroyuki Hirano, Tokorozawa; Toshiyuki Kimura, Kawagoe; Susumu Niinuma, Kawagoe; Minoru Yoshioka, Kawagoe; Akira Haeno, Kawagoe; Takashi Sato, Kawagoe; Yoshiro Nishi, Kawagoe; Yoshihiko Watanabe, Kawagoe; Fumihiko Yokogawa, Tokorozawa; Keiichi Matsumoto, Tokorozawa, and Youichi Ogawa, Tokorozawa, all of Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Continuation of Ser. No. 727,747, Apr. 26, 1985, abandoned. This application Sep. 12, 1988, Ser. No. 244,641

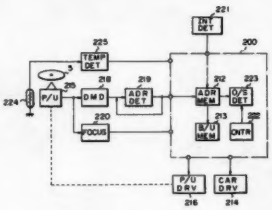
Claims priority, application Japan, Apr. 27, 1984, 59-062307[U]; Apr. 27, 1984, 59-085783; Apr. 27, 1984, 59-062305[U]; May 31, 1984, 59-111838

Int. Cl.[4] G11B *3/00, 21/08*

U.S. Cl. 369—32 **12 Claims**

1. An automatic disc player comprising signal pickup means operative to read information from a disc on which at least one of program and control signals including address information is recorded and to convert the information read from the disc into electric signals, the signal pickup means being movable with respect to the disc in a predetermined direction within the player and the signals being read from the disc at an information pickup spot which is movable with respect to the tracks on the disc, and pickup drive means operative to drive said signal pickup means for movement with respect to the disc in the player, wherein the improvement comprises:

a counter operative to count addresses at predetermined time intervals for producing a signal representative of an expected address indicative of the position to which said pickup means is expected to move in the next, said expected address thus being renewed at said predetermined time intervals;



a detector circuit operative to constantly detect a discrepancy between the newest one of the addresses read from the disc by said signal pick up means and said expected address and to produce a discrepancy detection signal each time when said discrepancy is found to exist; and

pickup drive control means for actuating said pickup drive means to drive said pickup means for movement to a position dictated by the expected address when said discrepancy detection signal appears successively a predetermined number of times.

4,879,706

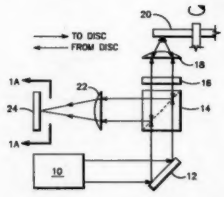
METHOD AND APPARATUS FOR FOCUS AND TRACKING IN AN OPTICAL DISK SYSTEM

Wai-Won Lee, Capertino, Calif., assignor to Laser Magnetic Storage International Company, Colorado Springs, Colo.

Filed Jul. 29, 1987, Ser. No. 79,653

Int. Cl.[4] G11B *5/09, 20/22*

U.S. Cl. 369—45 **20 Claims**



1. Apparatus useful in maintaining focus in a disk data-storage system, comprising:

radiation source means for producing a read/write beam of radiation;

focus means for focusing said read/write beam on the disk, wherein a portion of said read/write beam is reflected from the disk to produce a reflected beam;

optical element means for simultaneously producing from said reflected beam, first and second beams, said first beam

at a detector plane having at least a portion non-overlapping relation to said second beam;

first detector means at said detector plane for producing a first signal electrically representative of said first beam;

second detector means to produce a second signal electrically representative of said second beam;

means for combining said first signal and said second signal to produce a third signal, said third signal varying as a function of said degree of focus; and

a fourth signal produced using said second detector means, said fourth signal varying as a function of radial tracking of said read/write beam.

4,879,707

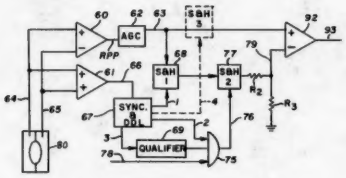
OPTICAL DISK TRACKING AND SEEKING SYSTEMS SPECIFIC TRACK FORMATS USING DISCONTINUITIES

Kurt W. Getreuer, Colorado Springs, Colo.; Johannes J. Verboom, Bergeijk, Netherlands, and Pierre R. Sonneville, Weert, both of Netherlands, assignors to Laser Magnetic Storage International Company, Colorado Springs, Colo.

Continuation of Ser. No. 760,439, Jul. 30, 1985, abandoned. This application Jan. 25, 1988, Ser. No. 148,028

Int. Cl.[4] G11B *7/09, 7/007*

U.S. Cl. 369—46 **7 Claims**



1. A record carrier wherein said record carrier has an information layer having tracks for storage of data, said tracks being comprised of longitudinally disposed sectors, each sector having an associated header and data area, said tracks being so arranged and disposed to form a diffraction grating, said record carrier comprising:

a first record carrier modulation means located in said record carrier sector header, said first record carrier modulation means comprising at least one discontinuity,

a second record carrier modulation means located in said record carrier sector header a predetermined distance from said first record carrier modulation means and including at least one qualifier modulation means, said qualifier modulation means includes a first pair of adjacent pits longitudinally separated from a triplet of adjacent pits that is longitudinally separated from a second pair of adjacent pits, a first discontinuity is located intermediate said first pair of adjacent pits and said triplet of adjacent pits, and a second discontinuity is located intermediate said triplet of adjacent pits and said second pair of adjacent pits, and

a third record carrier modulation means including timing means, said third record carrier modulation means located in said record carrier sector header and said data area.

4,879,708

OPTICAL DISK TRACKING AND SEEKING SYSTEMS SPECIFIC TRACK FORMATS USING WOBBLED PITS

Kurt W. Getreuer, Colorado Springs, Colo., and Johannes J. Verboom, Bergeyk, Netherlands, assignors to Laser Magnetic Storage International Company, Colorado Springs, Colo.

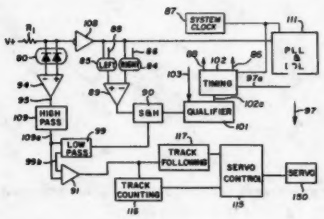
Continuation of Ser. No. 760,440, Jul. 30, 1985, abandoned. This application Jan. 25, 1988, Ser. No. 147,906

Int. Cl.[4] G11B *7/09, 7/007*

U.S. Cl. 369—46 **9 Claims**

1. An improved record carrier for use with a data storage apparatus wherein said record carrier has an information layer having tracks for storage of data, said tracks being comprised of longitudinally disposed sectors, each sector having an associated header, said record carrier comprising:

wobbled record carrier modulation means located in said record carrier sector headers, said wobbled record carrier modulation means including a first pair of non-reflective pits in a reflective surface located on a first side of and off-center from one track center, a second pair of non-reflective pits in a reflective surface of said record carrier



information layer located on a second side of and off-center from said one track center, and a third pair of non-reflective pits in a reflective surface of said record carrier information layer located substantially along said one track center and said third pair of non-reflective pits being positioned along said one track center between said first and second pairs of non-reflective pits, and

record carrier modulation clocking means.

4,879,709

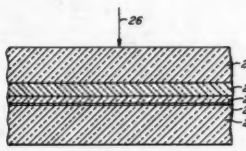
DYE-POLYMER OPTICAL DATA STORAGE MEDIA WITH IMPROVED RECORDING SENSITIVITY

Bryan K. Clark, Sunnyvale, Calif., assignor to Tandy Corporation, Ft. Worth, Tex.

Filed Feb. 5, 1988, Ser. No. 152,690

Int. Cl.[4] G11B *7/24*

U.S. Cl. 369—284 **11 Claims**



1. An optical data storage medium comprising:

a rigid substrate;

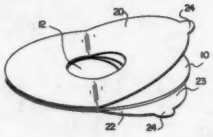
an expansion layer joined on one side to said rigid substrate, said expansion layer being absorptive of light at a first wavelength and reversibly expandable thereupon;

a retention layer joined to said expansion layer on the side opposite said rigid substrate, said retention layer having a glass transition temperature above ambient temperature and thereby convertible between a rubbery state permitting deformation in response to forces exerted thereon by said expansion layer and a glassy state substantially nonresponsive to said forces, said retention layer being absorptive of light at a second wavelength distinct from said first wavelength and further at least about 50% absorptive of light at said first wavelength passing through it in a single pass.

4,879,710
OPTICAL DISC PROTECTOR AND METHOD FOR APPLYING SAME

Mutsuo Iijima, 7-15 Ichiba Higashi Nakamachi, Tsurumi-ku, Yokohama City, Kanagawa, Japan

Filed Apr. 20, 1988, Ser. No. 183,923
Int. Cl.[4] G11B 7/24
U.S. Cl. 369—291 6 Claims



2. A protective cover for an optical disc having substantially flat opposing surfaces comprising:

a substantially transparent annular sheet having a top and bottom surface and an inner and an outer circumference;

an inner ring of adhesive applied to said bottom surface adjacent to said inner circumference; and

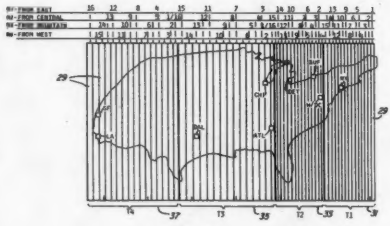
an outer ring of adhesive applied to said bottom surface adjacent to said outer circumference.

said bottom surface, when said protective cover is applied to said optical disc, being substantially in contact with one of said substantially flat opposing surface of said optical disc, and further comprising a first peelable layer on said top surface and a second peelable layer on said bottom surface.

4,879,711
SATELLITE COMMUNICATIONS SYSTEM EMPLOYING FREQUENCY REUSE

Harold A. Rosen, Santa Monica, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 96,983, Aug. 14, 1986, Pat. No. 4,819,227. This application Oct. 14, 1987, Ser. No. 108,831
Int. Cl.[4] H04Q 11/02
U.S. Cl. 370—50 13 Claims



1. A method of communicatively interconnecting any of a plurality of terminals within an area on the earth using an earth-orbiting communications satellite, comprising the steps of:

(A) forming a first plurality of groups of radio frequency beams respectively between each of a plurality of essentially contiguous zones covering said area on the earth and said satellite, the beams in said groups thereof carrying communications signals over the same first preselected range of frequencies, such that said first preselected range of frequencies is reused by the beams for all of said zones;

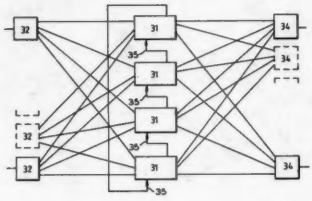
(B) separating each group of said radio frequency beams into first and second sets thereof respectively carrying communications signals over first and second sets of frequencies within said first preselected range of frequencies, and spatially distributing said first preselected range of frequencies over each of the zones as a function of frequency such that the frequencies of one set of said beams in one zone is spatially separated from the frequencies of one set of said beams in a zone substantially contiguous to said one zone;

(C) alternately transmitting the first and second sets of said beams between said zones and said satellite by simultaneously transmitting the beams in the first set thereof for all the zones and then simultaneously transmitting the beams in the second set thereof for all the zones.

4,879,712
COMMUNICATIONS SWITCH

Morgan Littlewood, Unit 8, 17 Como Avenue, South Yarra, Melbourne, Australia (3141)

Filed Sep. 1, 1988, Ser. No. 239,236
Claims priority, application United Kingdom, Sep. 2, 1987, 8720605
Int. Cl.[4] H04J 3/26
U.S. Cl. 370—60 17 Claims

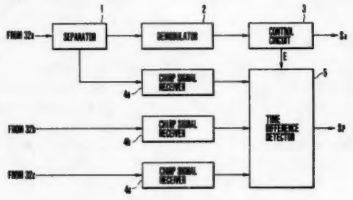


1. A communications switch comprising a plurality of synchronised packet switches (31) connected by data links to a plurality of switch input nodes (32) and with the synchronised packet switch (31) connected by data links to a plurality of switch output nodes (34), at least one of the synchronised packet switches (31) recirculating packets to another of the synchronised packet switches (31) via a recirculated data highway (35).

4,879,713
SATELLITE-BASED VEHICLE COMMUNICATION/POSITION DETERMINATION SYSTEM

Osamu Ichiyoshi, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Sep. 27, 1988, Ser. No. 249,943
Claims priority, application Japan, Sep. 30, 1987, 62-246285
Int. Cl.[4] H04J 1/02; H04B 7/85
U.S. Cl. 370—75 1 Claim



1. A satellite-based vehicle communication/position determination system comprising:

N geostationary satellites, N being an integer greater than or equal to 3; at least one vehicle station; and a base station, each of said vehicle station comprising:

a low-directivity antenna for performing radio-wave exchange with said N geostationary satellites;

vehicle station FDM (frequency division multiplex) receiving means for frequency-selectively receiving a signal in a communication frequency channel assigned to the self station from various signals in a plurality of communication frequency channels received at said low directivity antenna;

vehicle station receiving control means for transmitting a signal output of said vehicle station FDM receiving means as a receiving signal to a following circuit, and detecting a base station control signal from the signal output;

chirp signal generating means for generating a chirp signal for performing frequency sweep over all the bandwidth of a satellite network at a predetermine sweep rate for a predetermined period of time in response to a frame sync signal detected and formed by said vehicle station FDM receiving means; and

vehicle station transmitting means for transmitting a communication signal including a position determination start signal from said low-directivity antenna to said N geostationary satellites in the communication frequency channel assigned to the self station, interrupting the transmission of the communication signal for a period of time designated by a control signal from said base station and transmitting the chirp signal from said low-directivity antenna during the interruption period, and

said base station comprising:

N high-directivity antennas for respectively performing radio-wave exchange with said N geostationary satellites;

base station FDM transmitting means for transmitting, from at least one of said N high-directivity antennas to the corresponding geostationary satellite, signals in one or a plurality of communication frequency channels in which the communication signal including the base station control signal for designating a time period for which the chirp signal is to be transmitted is inserted;

base station FDM receiving means for receiving and demodulating signals in one or a plurality of communication frequency channels received at one of said N high-directivity antennas;

base station reception control means for transmitting the signal output from said base station FDM receiving means to a following circuit as a receiving signal, and detecting a start signal from the signal output;

N chirp signal receiving means including chirp filters for performing pulse compression processing of the chirp signals received at said N high-directivity antennas; and

time difference detecting means for detecting time differences among N compressed pulses sent from said N chirp signal receiving means in response to the detection of the start signal, and forming a position determination signal for calculating the position of the vehicle station.

4,879,714

CHANNEL ASSIGNMENT SYSTEM FOR LOOP NETWORK

Kazutoshi Maeno, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Nov. 19, 1985, Ser. No. 799,582

Claims priority, application Japan, Nov. 20, 1984, 59-245326; Nov. 20, 1984, 59-245327

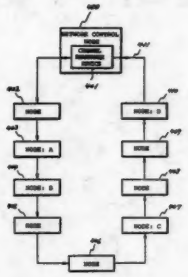
Int. Cl.[4] H04J *3/16*

U.S. Cl. 370—85.7 **3 Claims**

1. A communication network comprising:

a plurality of nodes connected in series with one aother in a single loop communication system in which information from a node is transmitted to other nodes using a time division channel switching method, and

a network control node connected in said single loop, said network control node including means for rearranging channel assignments by cyclically shifting the channels after every round through said single loop, said channel assignment rearranging means operative for rearranging channel assignments on a number, n, of channels smaller in number than a number, N, of nodes communicating with each other such that $n=N-1$, where n and N are integers and N is greater than 2,



wherein $N-1$ channels are assigned upon establishment of communication between N nodes, where information from each node is simultaneously transmitted to the remaining $N-1$ nodes by using said $N-1$ channels on said loop system.

4,879,715

TERMINAL EQUIPMENT IDENTIFIER CONTROLLING CIRCUIT

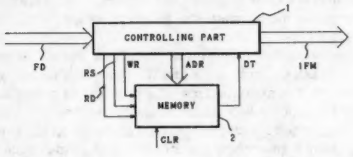
Takeo Nakabayashi, and Hideki Andou, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Aug. 22, 1988, Ser. No. 217,011

Claims priority, application Japan, Jan. 19, 1988, 63-9951

Int. Cl.[4] H04J *3/24*

U.S. Cl. 370—92 **5 Claims**



1. A terminal equipment identifier controlling circuit, for use in a communication apparatus which identifies terminal equipment by means of terminal equipment identifiers, comprising:

a memory, having a plurality of address storage locations, associated with a given terminal equipment unit;

means, coupled to said memory, for supplying said memory with a given terminal equipment identifier as an address signal;

means, coupled to said memory and to said supplying means, for writing binary data, indicating whether said given terminal equipment unit is to respond to said given terminal equipment identifier to a storage location of said memory corresponding to said address signal given by said supplying means;

means, coupled to said memory, for reading said binary data from said storage location; and

means, coupled to said reading means, for responding to said data associated with said given terminal equipment identifier when said read binary data indicates said terminal

equipment has been assigned said terminal equipment identifier.

4,879,716

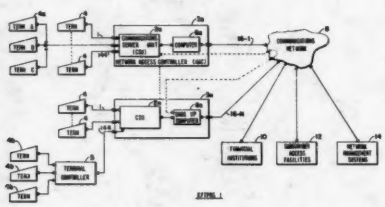
RESILIENT DATA COMMUNICATIONS SYSTEM

Lance McNally, Townsend; Anthony J. Booth, Boxboro, and Peter S. Morley, Pepperell, all of Mass., assignors to BULL HN Information Systems Inc., Billerica, Mass.

Filed Dec. 23, 1987, Ser. No. 137,315

Int. Cl.[4] G06F *11/16*

U.S. Cl. 371—8.2 4 Claims



1. A resilient data communications system for transferring information between a subscriber and a communication network, the data communications system comprising:

a. terminal means;

b. relay switching means;

c. a plurality of conversion means;

d. a bus means;

e. a plurality of network processor means;

f. a computer means; and

g. control module means,

wherein in the data communications system:

a. the terminal means is connected to the relay switching means;

b. the relay switching means is connected between the terminal means and the plurality of conversion means;

c. the plurality of conversion means is connected between the relay switching means and the bus means;

d. the bus means is connected between the plurality of conversion means and the plurality of network processor means;

e. the plurality of network processor means is connected between the bus means and the computer means, and there is also a connection from the plurality of network processor means to said communication network;

f. the computer means is connected between the plurality of network processor means and said communication network; and

g. the control module means is connected between the plurality of network processor means and a control input of the relay switching means

and wherein further in the data communications system:

a. the terminal means is for passing serial digital data bidirectionally between the relay switching means and a subscriber operating a keyboard and viewing a display;

b. the relay switching means is adapted to select one certain of the plurality of conversion means in response to a signal at its input from the control module means and to pass serial digital data bidirectionally between the terminal means and the one certain of the conversion means;

c. the conversion means is adapted to convert data bidirectionally between serial digital data and parallel data bytes, to transmit parallel data bytes bidirectionally to or from the bus means, and to transmit serial digital data bidirectionally to or from the relay switching means;

d. the plurality of network processor means is adapted to convert data bidirectionally between parallel data bytes and serial digital data, to transmit parallel data bytes bidirectionally to or from the bus means, and responsive to the computer means to transmit serial digital data bidirectionally to or from the computer means; and

e. the computer means is adapted to transmit serial data bidirectionally from or to the communications network responsive to control signals thereon, and to send control signals to the plurality of network processor means,

and wherein further the plurality of network processor means is adapted to detect, responsive to signals from the computer means, that the computer means has ceased to function and to thereupon request, via its connection to said communications network, control signals from the computer means of a different resilient communications systems, and the computer means is adapted to receive via said communications network requests for control signals from the network processor means of a different communications system and to provide such control signals via said communications network,

whereby if at least two resilient communications systems are connected to a communications network, functionality of both may be maintained despite failure of the computer means of one of them.

4,879,717

TESTABLE CARRIERS FOR INTEGRATED CIRCUITS

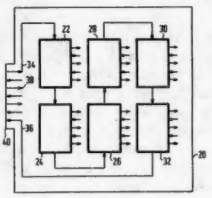
Wilhelm A. Sauerwald, Eindhoven; Johannes DeWilde, Hilversum; Karel J. E. Van Eerdewijk, Best; Franciscus P. M. Beenker, and Marinus T. M. Segers, both of Eindhoven, all of Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Division of Ser. No. 902,910, Sep. 2, 1986. This application Sep. 2, 1988, Ser. No. 239,714

Claims priority, application Netherlands, Sep. 11, 1985, 8502476

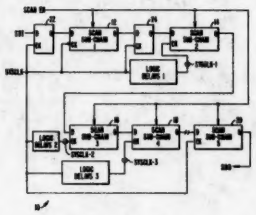
Int. Cl.[4] G06F *11/00*

U.S. Cl. 371—22.3 8 Claims



1. A boundary-scan testable carrier provided with a first and a second integrated circuit mounted thereon and provided with a multibit data path therebetween, said first circuit having a first attachment to a serial bidirectional on-carrier bus such that said first circuit receives a first test control bit string followed by a serial test pattern, and said first circuit having a serial-to-parallel conversion means for feeding said serial test pattern to a multibit output buffer in said first circuit and connected to said data path, said second circuit having a multibit input buffer connected to said data path, a second attachment from said second circuit to said bus for receiving from said bus a second test control bit string and outputting to said bus a serial result pattern as received from said multibit input buffer via a parallel-to-serial conversion means, said result pattern representing a test result of an interconnection function via said data path as controlled by said first and second test control bit strings.

4,879,718
SCAN DATA PATH COUPLING
Martin W. Sanner, San Jose, Calif., assignor to Tandem Computers Incorporated, Cupertino, Calif.
Filed Nov. 30, 1987, Ser. No. 126,998
Int. Cl.[4] G01R 31/28
U.S. Cl. 371—22.3 3 Claims



1. In a digital logic unit of the type including a plurality of logic elements, such as AND gates and OR gates, and elemental memory units (MUs), such a flip-flops, latches, registers, and counters, that are connected to function as a part of the logic unit during a normal mode, where the MUs are serially connected to form the register elements of a scan line shift register (SR) during a scan mode, where a system clock signal (SCLK) is received at an SCLK input, and where the scan SR is used to shift a scan data pattern, received at a scan SR input, into the SR register elements during the scan mode to test the operability of the stages and interconnections of the logic unit, a system for preventing corruption of the scan data pattern comprising:

means, coupled to every SR register element, for serially connecting the SR register elements during the scan mode with each SR register element having a clock input for receiving a delayed version of SCLK with the magnitude of the delay relative to the undelayed SCLK signal determined by the delays induced by the particular logic elements connecting the SCLK input port to said clock input of a particular SR register element;

a first scan sub-chain of serially connected SR register elements including only SR register elements receiving a delayed version of SCLK having a delay of a first fixed magnitude;

a second scan sub-chain of serially connected SR register elements including only SR register elements receiving a delayed version of SCLK having a delay of a second fixed magnitude, with said first magnitude being greater than said second magnitude and with said first scan sub-chain being nearer to the scan SR input than said second scan sub-chain.

4,879,719
LATCHING MECHANISM
Alex C. Dumestre,III, Covington, La., assignor to Western Atlas International, Inc., Houston, Tex.
Filed Feb. 17, 1988, Ser. No. 157,298
Int. Cl.[4] G01V 1/38
U.S. Cl. 367—20 18 Claims

1. An apparatus for coupling a device to a marine cable, said apparatus comprising:

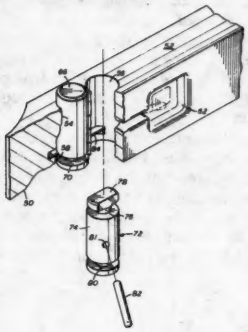
(a) first mounting means fixed to said cable and having an aperture therein;

(b) second mounting means fixed to said device including pin means and a locking means each adapted for engaging said aperture of said first mounting means, said locking means further comprising:

(1) a cylinder having a second end disposed within said second mounting means adjacent and parallel to said pin means, and a first end extending from the second mounting means to engage the aperture;

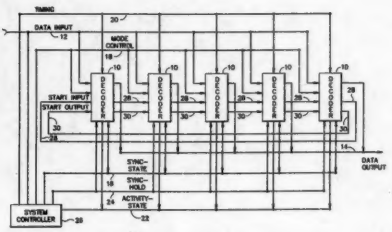
(2) cam means defined at the first end of the cylinder;

(3) means engaging said second end of the cylinder for exerting a tensional force upon the cylinder within the second mounting means; and



(c) means for rotating said locking means thereby placing the cam in a locked and unlocked position within the aperture, for detachably coupling said device to said cable.

4,879,720
DECODER RING SYSTEM
William A. Shumate; Daniel R. Kindred, both of San Diego; Franklin P. Antonio, Del Mar; Steven H. Gardner, San Diego; Krishnanand Kelkar, La Jolla, Calif.; Thomas R. Bilotta, Vista, and Steven L. Rogers, San Diego, all of Calif., assignors to M/A-Com Government Systems, Inc., San Diego, Calif.
Filed Mar. 10, 1988, Ser. No. 166,187
Int. Cl.[4] G06F 11/10
U.S. Cl. 371—43 22 Claims



1. A decoding system capable of outputting Viterbi-decoding-algorithmdecoded data at a predetermined rate that is greater than a given rate at which coded data is processed in accordance with said algorithm by a single decoder to produce the decoded data, comprising

a data input bus;

a data output bus;

a ring of decoders, with each decoder coupled to the input bus for receiving coded data from the input bus and coupled to the output bus for providing decoded data onto the output bus;

wherein each said decoder includes

an input buffer for responding to a start-input signal from a preceding decoder in the ring by buffering a block of the received coded data;

means for providing a start-input signal to a succeeding decoder in the ring at such time as to cause the succeeding decoder to receive a block of coded data from the input

bus that overlaps the block of coded data received from the input bus by the instant said decoder;

processing means for processing the buffered block of coded data in accordance with a Viterbi decoding algorithm at a given rate to produce decoded data;

an output buffer for buffering the block of decoded data;

means for responding to a start-output signal provided by a preceding decoder in the ring by causing the buffered decoded data to be provided onto the data output bus at a predetermined rate that is greater than the given rate at which the coded data is processed to produce the decoded data; and

means for providing a start-output signal to the succeeding decoder in the ring to cause the succeeding decoder to provide a portion of the buffered decoded data therein onto the data output bus at a predetermined rate and at such time as to be continuous from and not overlap the portion of the buffered decoded data provided onto the output data bus from the instant said decoder.

4,879,721

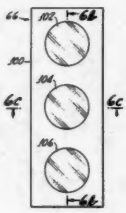
PHASE LOCKED LASER ARRAY

Michael T. Braski; Charles H. Wissman, both of Carlsbad; Richard A. Tilton, San Diego, and Paul F. Robusto, Carlsbad, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Nov. 21, 1988, Ser. No. 274,117

Int. Cl.[4] H01S *3/098*

U.S. Cl. 372—18 **12 Claims**



1. A waveguide laser array comprising:

a laser body having a common, physically unpartitioned, cavity,

a laser medium within the cavity,

first and second reflectors secured to the body at opposite ends of the cavity, said first reflector including first and second areas of relatively high reflectivity spaced from one another by areas of relatively low reflectivity,

a first set of electrode disposed on opposite sides of said cavity and extending substantially the length of the cavity,

a second set of electrodes adjacent said first set, said second set being disposed on opposite sides of said cavity and extending substantially the full length of said cavity, and

first and second RF exciting power sources connected to provide RF exciting signals to said first and second sets of electrodes respectively to produce laser energy oscillations of substantially the same frequency in functionally separate and isolated regions along the length of said cavity, said regions being aligned with respective ones of said areas of relatively high reflectivity.

4,879,722

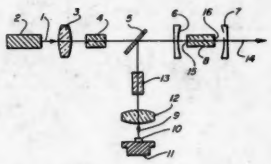
GENERATION OF COHERENT OPTICAL RADIATION BY OPTICAL MIXING

George J. Dixon, Lutz, Fla.; Douglas W. Anthon, and John H. Clark, both of Wheaton, Ill., assignors to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 78,373, Jul. 27, 1987. This application Nov. 25, 1987, Ser. No. 125,161

Int. Cl.[4] H01S *3/10*

U.S. Cl. 372—21 **30 Claims**



16. An apparatus for generating coherent optical radiation which comprises:

(a) means for generating coherent optical radiation of a first frequency, w_1;

(b) means for generating coherent optical radiation of a second frequency, w_2, which comprises a laser diode;

(c) an optical cavity;

(d) means for introducing said radiation of a first frequency and said radiation of a second frequency into said optical cavity; and

(e) nonlinear optical means within said optical cavity for converting said radiation of a first frequency and said radiation of a second frequency into coherent optical radiation of a third frequency, w_3, by optical mixing.

4,879,723

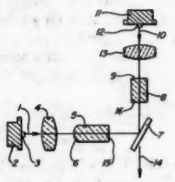
INTRACAVITY GENERATION OF COHERENT OPTICAL RADIATION OF OPTICAL MIXING

George J. Dixon, Lutz, Fla.; Douglas W. Anthon, and John H. Clark, both of Wheaton, Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Jul. 27, 1987, Ser. No. 78,373

Int. Cl.[4] H01S *3/10*

U.S. Cl. 372—21 **45 Claims**



23. An apparatus for generating coherent optical radiation which comprises:

(a) means for generating coherent optical radiation of a first frequency, w_1, which comprises a lasant material within an optical cavity;

(b) means for generating coherent optical radiation of a second frequency, w_2, which is outside of said optical cavity and comprises laser diode;

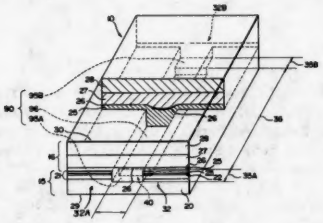
(c) means for introducing said radiation of a second frequency into said optical cavity; and

(d) nonlinear optical means within said optical cavity for interacting with said radiation of a first frequency and said radiation of a second frequency to generate coherent optical radiation of a third frequency, w_3.

4,879,724
SEMICONDUCTOR LASER

Kenji Matsumoto, Yokohama, and Haruki Kurihara, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 17, 1988, Ser. No. 195,684
Claims priority, application Japan, May 18, 1987, 62-118905
Int. Cl.[4] H01S *3/19*
U.S. Cl. 372—46 **4 Claims**



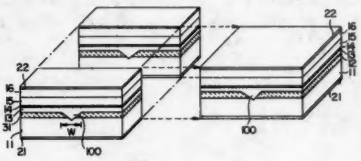
1. A semiconductor laser comprising:
a substrate including a semiconductor basement of a first conductivity type and a semiconductor current-blocking-layer of a second conductivity type formed on said basement;
a straight channel groove formed within said basement;
a first cladding layer of the first conductivity type grown on said substrate by a liquid-phase-epitaxy (LPE);
a semiconductor active layer formed on said first cladding layer and grown by the LPE;
a second cladding layer of the second conductivity type formed on said active layer;
a semiconductor ohmic contact layer of the second conductivity type formed on said second cladding layer;
a first metal electrode disposed on said semiconductor ohmic layer;
a second metal electrode disposed on a lower surface of said semiconductor basement; and
a pair of cleaved facets perpendicular to said channel groove and forming front and back ends of a laser cavity with said channel groove having a constant width throughout said laser cavity and a shallow channel portion of a first height in the vicinity of said cleaved facets and a deep channel portion of a second height, higher than said first height, in a middle portion of said laser cavity.

4,879,725
SEMICONDUCTOR LASER DEVICE HAVING EXTENDED FACET LIFE

Hidenori Kawanishi, Higashiosaka; Masahiro Yamaguchi, Tokai; Hiroshi Hayashi, Kyoto; Taiji Morimoto, and Shinji Kaneiwa, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Aug. 30, 1988, Ser. No. 238,728
Claims priority, application Japan, Sep. 4, 1987, 62-222766
Int. Cl.[4] H01S *3/19*
U.S. Cl. 372—48 **5 Claims**

1. In a semiconductor laser device comprising a p-type semiconductor substrate and a multi-layered crystal structure with an active layer for laser-oscillating operation, the said multi-layered crystal structure being disposed on said substrate and having a striped channel area through which current is supplied to said active layer and a light-absorbing area positioned outside of said channeled area by which a difference between the amount of light to be absorbed inside said channeled area and the amount of light to be absorbed outside said channeled area is created, which causes a difference in the effective refractive index of said active layer, resulting in an optical waveguide in said active layer, wherein said light-absorbing area comprises a p-type semiconductor substance in

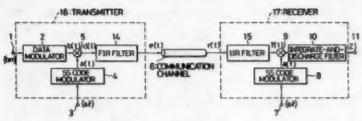


the vicinity of at least one of both facets, and comprises an n-type semiconductor where it is not a p-type semiconductor.

4,879,726
SPREAD SPECTRUM COMMUNICATIONS SYSTEM

Masaki Kobayashi; Yoshio Itoh, both of Tokyo, and Hiroji Kusaka, 173, 1-cho, Hojo-machi, Sakai-shi, Osaka, 591, all of Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo and Hiroji Kusaka, Osaka, both of, Japan

Filed Oct. 6, 1987, Ser. No. 104,889
Claims priority, application Japan, Oct. 8, 1986, 61-238125
Int. Cl.[4] H04K *1/00*
U.S. Cl. 375—1 **19 Claims**



13. A spread spectrum communications system comprising:
a transmitter including:
means for modulating a data signal containing transmit data;
means for multiplying said modulated data signal with a modulated spread spectrum code and for producing an output corresponding to the multiplication product; and
an FIR filter for receiving said output of said multiplying means and producing a transmit signal, said FIR filter including multipliers having predetermined coefficients selected to suppress the peaks of said transmit signal from said FIR filter; and
a receiver linked to said transmitter by a communication channel to receive said transmit signal from said transmitter, said receiver comprising:
a filter having a characteristic inverse to that of said FIR filter, for receiving said signal and supplying an output corresponding thereto; and
means for multiplying said output of said filter in said receiver with a modulated spread spectrum signal to restore the modulated transmit data.

4,879,727
ADAPTIVE THRESHOLD SAMPLING CONTROLLER

Nallepilli S. Ramesh, San Jose, Calif.; Suresh Cheemalavagu, Austin, Tex., and Anders Erikson, Bandhagen, Sweden, assignors to Advanced Micro Devices Inc., Sunnyvale, Calif.

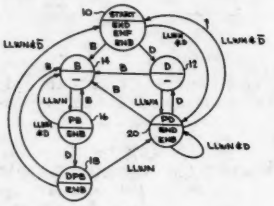
Filed Sep. 5, 1986, Ser. No. 904,540
Int. Cl.[4] H04L *25/06*
U.S. Cl. 375—76 **5 Claims**

4. A method of enabling the selective sampling of marks in a sequence of frames complying with CCITT standards to permit frame by frame adjustment of the threshold voltage of a data detector in terminal equipment of a communication system, said frames each having a plurality of bit positions including predetermined bit positions for B-marks, D-marks, F-marks and L-marks, said method comprising the steps of:

(1) sequentially testing said bit positions in a previous said frame of said sequence,

(2) enabling the sampling of only B-bit positions in the current said frame when said sequential testing of bit positions in said previous frame produces a high B-bit mark prior to a high D-bit mark,

(3) enabling the sampling of both B-bit positions and D-bit positions in the current said frame when said sequential



testing of bit positions in said previous frame produces a high D-bit mark prior to a high B-bit mark,

(4) enabling the sampling of only the F-bit position in the current said frame when said sequential testing of bit positions in said previous frame produces no high B-bit marks and no high D-bit marks, and

(5) buffering the signal strength of the sampled bit position for use in adjusting said threshold voltage.

4,879,728

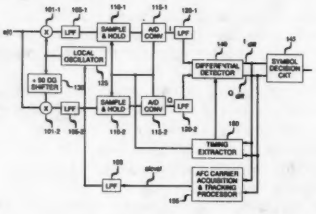
DPSK CARRIER ACQUISITION AND TRACKING ARRANGEMENT

Joseph A. Tarallo, Bedminster, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jan. 31, 1989, Ser. No. 304,680

Int. Cl.[4] H04L *27/22*

U.S. Cl. 375—80 **32 Claims**



1. In an MDPSK communication receiver including a frequency source, means for translating a received MDPSK signal having inphase I and quadrature phase Q components to a prescribed band and means for demodulating the prescribed band MDPSK signal, a method for synchronizing the frequency of the receiver frequency source with the carrier frequency of the received MDPSK signal comprising in the steps of:

forming a signal representative of the inphase component of the phase difference between immediately successive received symbols for each symbol of the prescribed band MDPSK signal;

forming a signal representative of the quadrature phase component of the phase difference between immediately successive received symbols for each symbol of the prescribed band MDPSK signal;

defining a preamble interval in the received MDPSK signal during which a prescribed sequence of symbols is received;

comparing the inphase difference component signals of the symbols of the preamble interval with the quadrature phase difference component signals of the symbols of the preamble interval to form at least one signal representative of a predetermined relationship between the inphase difference component signals and the quadrature phase difference component signals of the preamble interval; and

adjusting the frequency of the receiver frequency source responsive to the at least one predetermined relationship signal.

4,879,729

APPARATUS FOR THE DECODING CODED FREQUENCY MODULATED SIGNALS

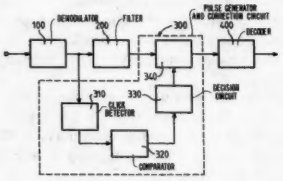
Philippe Salembier, Paris, and Moustanir Lamnabhi, Limeil-Brevannes, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 21, 1988, Ser. No. 223,459

Claims priority, application France, Jul. 24, 1987, 87 10580

Int. Cl.[4] H04B *1/10*

U.S. Cl. 375—104 **8 Claims**



1. A circuit for decoding coded frequency-modulated signals having a frequency demodulator, a detector coupled to the frequency demodulator and including detection and comparison circuits for detecting noise pulse signals, a pulse-generating circuit coupled to the detector, and a correction circuit coupled to the pulse generating circuit for eliminating perturbing effects of noise pulse signals wherein the detector comprises a linear filter having a transfer function of the type

$$H(f) = \frac{DESAC^*(f) \cdot CLIC(f)}{DESP(num) + DESP(BC)}$$

where f is frequency, DESAC*(f) is a conjugated transfer function of a de-emphasis filter provided for the frequency modulation, CLIC(f) is a spectrum forming a noise pulse signal, DESP(num) is a spectral power density of a signal, and DESP(BC) is a spectral power density of continuous noise, and wherein the comparison circuit provides a zero signal or an output signal of the detector dependent on the output signal level with respect to a reference threshold, and further comprises

decision means coupled between the comparison circuit and the pulse-generating circuit for determining temporal position and polarity, of each noise pulse signal transmitted to the correction circuit.

4,879,730

JITTER TOLERANT CIRCUIT FOR DUAL RAIL DATA

Nirmal S. Virdee, Phoenix, and Hamid R. Baradaran, Glendale, both of Ariz., assignors to Siemens Transmission Systems, Inc., Phoenix, Ariz.

Filed May 31, 1988, Ser. No. 200,387

Int. Cl.[4] H03K *5/05*; H04L *7/00*

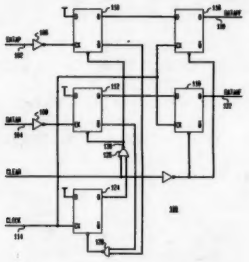
U.S. Cl. 375—106 **10 Claims**

1. A data timing circuit for converting half-width input data on a pair of data input lines into a full-width data output, comprising:

first and second flip-flop means for receiving said input data from said input lines respectively at clock inputs of said flip-flop means and having data outputs;

means for adapting said clock inputs of said first and second flip-flop means such that the leading edges of said input data clocks logic high pulses to the data outputs of said first and second flip-flop means;

pulse generation means receiving a train of clock pulses, for generating a reset pulse on the next positive clock edge occurring after said leading edges of said input data clocks logic high pulses to the data outputs of said first and second flip-flop means, to enable said first and second flip-flop means to receive further data input;



third and fourth flip-flop means having data inputs coupled to the data outputs of said first and second flip flops, whereby said data coupled to data inputs of said, third and fourth flip-flops is outputted to the data outputs thereof as full-width data by said next positive clock edge; and

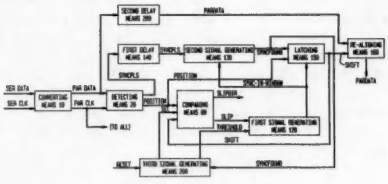
means for clocking said pulse generation means with a clock signal such that jitter present in said input data having greater than one half a data unit interval but less than one data unit interval with respect to said clock signal does not cause error in said transfer of data and resetting of said flip-flops.

4,879,731

APPARATUS AND METHOD FOR SYNC DETECTION IN DIGITAL DATA

Richard K. Brush, Los Altos, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Aug. 24, 1988, Ser. No. 235,869
Int. Cl.[4] H04L *7/04*
U.S. Cl. 375—116 **23 Claims**



1. An apparatus for locating a sync pattern in a digital data stream, comprising:

means, responsive to said digital data stream, for detecting the sync pattern, for generating a first signal in response to a condition in which said sync pattern occurs at a position in said digital data stream within a window about an expected position of said sync signal and for setting a width of said window in accordance with a value of a threshold signal; and

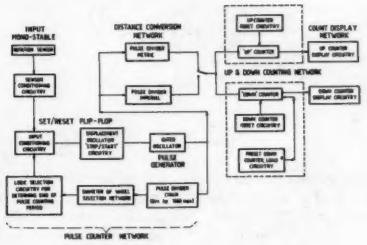
means, responsive to said first signal for generating said threshold signal to have (a) a first value causing said window to have a first width in response to a condition in which said first signal occurs within a predefined interval, and (b) a second value causing said window to have a second width greater than said first width in response to a condition in which said first signal does not occur within said predefined interval.

4,879,732

ODOMETER WITH DISTANCE TRAVELED AND DISTANCE REMAINING DISPLAYS

Zbigniew Dorosz, 3 Barkly Avenue, Richmond, Victoria, Australia

Filed Sep. 22, 1987, Ser. No. 99,544
Claims priority, application Australia, Sep. 22, 1986, PH8160
Int. Cl.[4] G01C *22/00*
U.S. Cl. 377—24.2 **8 Claims**



1. A portable programmable, self-contained odometer for use on a wheeled golf buggy, said odometer being mounted or adapted to be mounted on said golf buggy, said odometer having input means for receiving data relating to the distance travelled by said golf buggy from a motion sensor associated with said buggy, said odometer deriving distance travelled from said data, said odometer including a resettable up counter for determining distance travelled, the output of said up counter being used to display distance travelled on a first portion of a display means, said up counter being able to be reset at any time to set the count thereof to zero, a programmable down counter for determining distance travelled from a predetermined value, the output of said down counter being used to display distance remaining to a predetermined point on a said second portion of said display means, said distance travelled and said distance remaining to a predetermined point being displayed simultaneously on said display means, said up counter and said down counter being independent of each other, whereby the distance count programmed into said down counter as displayed on said second portion of said display means remains undisturbed irrespective of the distance count or resetting of said up counter as displayed on said first portion of said display means.

4,879,733

TIMER ARCHITECTURE FOR MULTI-TASK COMPUTERS AND FOR SERIAL DATA DECODING

Kenneth R. Burch, Austin, Tex., and Mario A. Rivas, West Palm Beach, Fla., assignors to Motorola, Inc., Schaumburg, Ill.

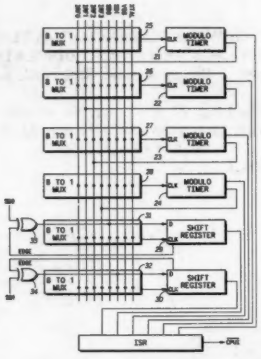
Filed Jan. 28, 1988, Ser. No. 149,323
Int. Cl.[4] H03K *21/38, 21/10*
U.S. Cl. 377—44 **11 Claims**

1. A timer comprising output means;

a plurality of modulo counters including a first and a second modulo counter with interrupts generated as a function of respective first and second different modulus values, each modulo counter having an input and an output; and

means for configuring the outputs of said plurality of mod-

ulo counters into one of either first or second configurations, wherein the input of said first modulo counter is coupled to a clock source and the output of said first modulo counter is coupled to the input of said second modulo counter and that an output of said second modulo counter is coupled to said output means in the first configuration whereby interrupts are generated according to



said first and second modulus values in series, and wherein the input of said second modulo counter is coupled to said clock source and the output of said second modulo counter is coupled to the input of said first modulo counter and that an output of said first modulo counter is coupled to said output means in said second configuration whereby interrupts are generated according to said second and first modulus values in series.

4,879,734

INSPECTION APPARATUS AND METHOD USING X-RAYS

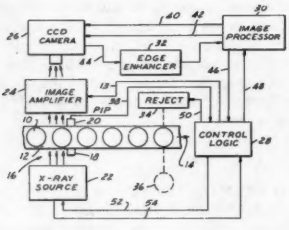
Jay G. Schreckendgust, Victor, N.Y.; James E. Pantelleria, and Mark M. Bergeron, both of Pontiac, Mich., assignors to X-Ray Industries, Inc., Troy, Mich.

Filed Dec. 9, 1986, Ser. No. 939,603

Claims priority, application Rep. of Korea, Dec. 9, 1985, 9246/1985

Int. Cl.[4] G01N *23/02*

U.S. Cl. 378—57 **15 Claims**



1. Apparatus for inspecting the contents of each of a plurality of containers continuously moving through an inspection station, comprising:

X-ray pulse generation means responsive to a first control signal for directing a pulse of X-rays through a container moving through said inspection station and resulting in the production of an X-ray image of the contents of said container for a pre-defined length of time , said X-ray image varying in amplitude as a function of time and having a peak portion occurring in time between the beginning and end of said pulse of X-rays;

image amplifying means responsive to a second control signal for amplifying said X-ray image for only

said peak portion

of said X-ray image to produce a substantially blurr-free optical image of said moving container;

camera means responsive to a third control signal for storing a set of optical image data representing

said substantially blurr-free optical image;

image processing means coupled with said camera means for automatically analyzing said set of optical image data to ascertain the contents of said container; and,

control means for generating said first, second and third control signals in synchronized relationship to each other.

4,879,735

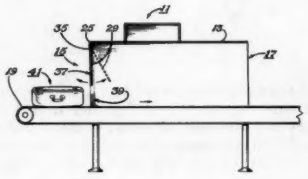
BAGGAGE INSPECTION CONVEYOR BAFFLE AND METHOD

Robert W. Owens, 1813 Westlake Ter., White Settlement, Tex. 76107

Filed May 31, 1988, Ser. No. 200,247

Int. Cl.[4] G21C *11/00*

U.S. Cl. 378—57 **6 Claims**



5. An improved baggage inspection device, comprising in combination:

conveyor means for transporting baggage from a first location to a second location;

a housing disposed above said conveyor means having an input port proximal to said first location and an output port proximal to said output port, each having an upper boundary defined by said housing and a lower boundary defined by said conveyor means;

means for non-intrusive inspection of said baggage horizontally disposed upon said conveyor means;

a substantially rigid planar baffle pivotally suspended from said upper boundary of said input port for substantially covering an upper selected region of said input port leaving a lower selected region of said input port proximal to said conveyor means uncovered, providing a clearance between said baffle and said conveyor means of substantially at least eight inches vertical height, wherein said lower selected region of said input port accomodates the passage of briefcase type baggage only when horizontally disposed upon said conveyor means, and wherein said substantially rigid planar baffle pivots to allow the passage of oversize baggage having a horizontal height exceeding said clearance.

4,879,736

X-RAY EXAMINATION APPARATUS

Ulf Bergman, Spanga; Jurgen Sommer, Sollentuna, and Arne Borggren, Jarfalla, all of Sweden, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Nov. 22, 1988, Ser. No. 274,275

Int. Cl.[4] G21K *7/00*

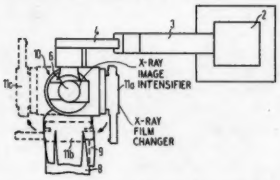
U.S. Cl. 378—181 **8 Claims**

1. An x-ray examination installation for examining a patient comprising: means for generating an x-ray beam in which said patient is disposed, and having a central ray;

an x-ray image intensifier having an image axis substantially coincident with said central ray;

an x-ray film changer;

means for mounting said x-ray film changer so that said x-ray film changer can be optionally moved through about 90° between an exposure position in front of said x-ray image



intensifier and a standby position out of said x-ray beam; and

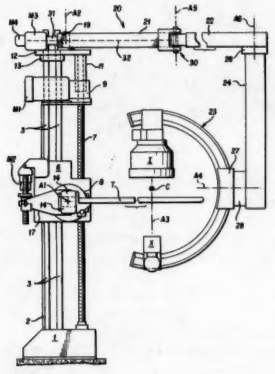
bearing means at least partially surrounding said x-ray image intensifier in a plane substantially perpendicular to said image axis, said x-ray film changer being attached to said bearing means and displaceable along said bearing means.

4,879,737

ARTICULATED X-RAY STAND ARM

John K. Grady, XRE Corporation, 300 Foster St., Littleton, Mass. 01460

Filed Mar. 13, 1989, Ser. No. 322,499
Int. Cl.⁴ H05G *1/02*
U.S. Cl. 378—196 **7 Claims**



1. X-ray apparatus for examination of a patient comprising:

an upright standard;

a patient table extending laterally from the standard;

a two-limbed support with an X-radiation source on one arm and an X-radiation receptor on the other arm; and

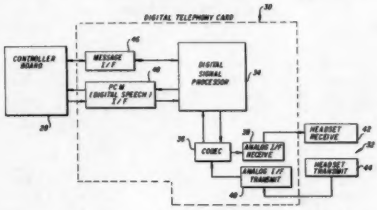
an arm pivoted to the standard on a first vertical axis and extending the pivot end of the standard to a free end connected to the two-limbed support to hold the source and receptor on a radiation axis through the table, the arm being articulately jointed between its pivoted end and free end on a second vertical axis intermediate the standard and support so as to selectively position the support at either side of the table, while supporting the X-radiation source and receptor and the patient table on a single floor based standard.

4,879,738

DIGITAL TELEPHONY CARD FOR USE IN AN OPERATOR SYSTEM

John F. Petro, Raleigh, N.C., assignor to Northern Telecom Limited, Montreal, Canada

Filed Feb. 16, 1989, Ser. No. 311,288
Int. Cl.⁴ H04B *3/20*
U.S. Cl. 379—3 **32 Claims**



1. A device for establishing a desired operator audio level in an operator position means, comprising:

(a) processor means for processing digital signals for generating a desired receive audio level in an operator position means for use by an operator;

(b) conversion means for converting analog speech transmit signal from a telephone transmit means to digital for input to said processor means and for converting digital receive signal from said processor means to analog receive signal for input to a telephone receive means;

(c) means for connecting said processor means to a telecommunications network; and

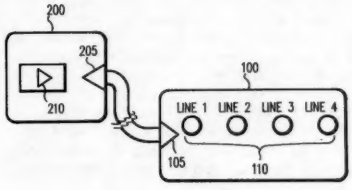
(d) said processor means including control means for said operator for permitting said operator to modify the desired receive audio level.

4,879,739

WIRING TEST DEVICE AND METHOD

Henry M. Forson, 4218 Downing St., Annandale, Va. 22003

Filed Dec. 14, 1988, Ser. No. 284,391
Int. Cl.⁴ H04B *3/46*; H04M *1/24*
U.S. Cl. 379—21 **14 Claims**



1. A system for detecting faults in a line which consists of a plurality of wires therein, comprising:

a generating means having a generating port, which is removably connectable to one end of said line, for generating coded pulsed signals on each of said plurality of wires, and

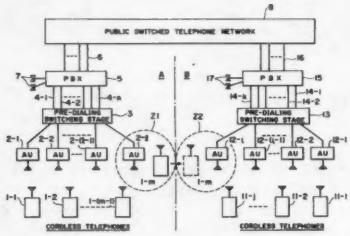
a receiving means having a receiving port, which is removably connectable to an opposite end of said line, for receiving and displaying said coded pulsed signals generated by said generating means, wherein

said coded pulsed signals are uniquely distinct signals for each of said plurality of wires.

4,879,740
WIDE AREA CORDLESS TELEPHONE SYSTEM HAVING MEANS FOR AVOIDING DOUBLE REGISTRATIONS

Noriaki Nagashima; Kohji Monma, both of Tokyo, and Yoshitoshi Murata, Kanagawa, all of Japan, assignors to NEC Corporation and Nippon Telegraph and Telephone Corporation, both of Tokyo, Japan

Filed Apr. 4, 1988, Ser. No. 177,273
Claims priority, application Japan, Apr. 3, 1987, 62-83586
Int. Cl.[4] H04Q *7/04*
U.S. Cl. 379—61 4 Claims



1. A wide area cordless telephone system covering a service area which is divided into a plurality of local areas, comprising:

a plurality of home position portable cordless telephone provided in each one of said local areas, each of said home position cordless telephones having a corresponding line terminal in a telephone switching system and multi-channel access means for establishing a two-way radio link, transmitting a registration request through the established link upon entry of a manual command and subsequently transmitting an acknowledgement upon receipt of a response identifying a local area, said request identifying the cordless telephone which transmitted the request;

a plurality of access units provided in said one local area for establishing said radio links with said home position cordless telephones and non-home position cordless telephones belonging to another level area; and

a pre-dialing switching stage provided in said one local area for establishing a connection between said access units and line terminals of said telephone switching stage including control means connected to said access units for receiving said request and acknowledgement therethrough, transmitting a response identifying the local area of said pre-dialing switching stage through one of said access units on receiving a registration request and assigning a reserved line terminal of said telephone switching system to a non-home position cordless telephone if the same is identified by the received request, and making registration of a cordless telephone on receiving an acknowledgement identifying the same local area as identified by said transmitted response.

4,879,741
FAX/TELEPHONE SWITCHING DEVICE

Frank Liu, Taipei, Taiwan, assignor to Unisource Corp., Taiwan

Filed Nov. 23, 1987, Ser. No. 124,001
Int. Cl.[4] H04M *11/00*
U.S. Cl. 379—100 1 Claim

1. A fax/telephone switching device for a fax machine comprising a calling circuit (1), a call-detection circuit (2), a tone-detector circuit (3), a telephone-hold circuit (4), a telephone sounding circuit (5), a first switch control circuit (6) having a first switch for voice communication, and a second switch control circuit (7) having a second switch for fax transmission;

said calling circuit (1) comprising a photo-coupler (11) electrically connected to said call-detection circuit (2);

said calling circuit actuated by an input signal which is rectified by a power source circuit;

said photo-coupler (11) sending a high-level signal to said call-detection circuit (2);

said call-detection circuit (2) comprising a plurality of inverters, a charged circuit (21) and a first D-type flip-flop;

said signal from said photo-coupler (11) being converted to a low-level signal by said inverter, and inputting said low-level signal into said D-type flip-flop after being charged by said charged circuit (21);

said tone-detector circuit (3) including a tone-detector integrated circuit, an RC circuit (31) and a second D-type flip-flop connected to said tone-detector integrated circuit; an output of said first D-type flip-flop being connected to an input of said second D-type flip-flop;

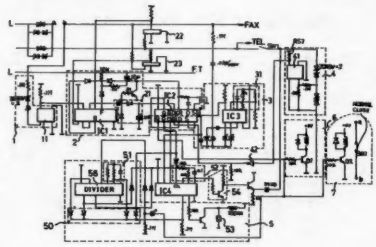
said RC circuit (31) producing a constant frequency signal;

said tone-detector integrated circuit connected to said RC circuit (31) and storing said constant frequency signal as a reference frequency for comparing with said input signal;

said second D-type flip-flop connected to a second inverted integrated circuit and first switch control circuit (6);

said second inverted integrated circuit connected to said second switch control circuit (7);

said tone-detector integrated circuit sending a low-level signal to said second inverted integrated circuit when said tone-detector integrated circuit detects that said input signal has a frequency equal to said reference frequency;



said second inverted integrated circuit converting said low-level signal to a high-level signal and sending said high-level signal to said second D-type flip-flop;

said seciond D-type flip flop sending a high-level signal to said first switch control circuit (6) to set said first switch on;

said second inverted integrated circuit sending a low-level signal to said second switch control circuit (7) to set said second switch off;

said telephone-hold circuit (4) being connected to and controlled by said second D-type flip-flop of said tone-detector circuit (3);

said telephone sounding circuit (5) comprising a blind-tone oscillator (52), a buzzer oscillator (51), a divider (56) and a buzzer (53);

an input of said blind-tone oscillator (52) being connected to an output of said second D-type flip-flop;

an input of said buzzer oscillator (51) being connected to an output of said second inverted integrated circuit;

said second D-type flip-flop enabling said blind-tone oscillator (52) when said second D-type flip-flop receives said high-level signal from said second inverted integrated circuit, and said blind-tone oscillator (52) producing a blind-tone to notify a telephone-caller to wait;

said second inverted integrated circuit enabling said buzzer oscillator (51) to actuate said divider (56) to drive said buzzer (53) when said second inverted integrated circuit

receives said low-level signal from said tone-detector integrated circuit;

second and third photo-coupling devices (22), (23) connected to said power source circuit and actuated by said input signal;

said photo-coupling devices (22), (23) connected to inputs of said calling circuit (1);

said third photo-coupling device (23) connected to a reset pin of said first D-type flip-flop;

when said input signal being for fax transmission, said second photo-coupling device (22) being actuated; and

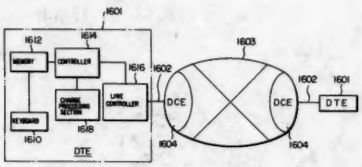
said third photo-coupling device (23) being actuated so as to enable said first D-type flip-flop and to actuate said buzzer oscillator (51) and said blind-tone oscillator (52) when said input signal being for voice transmission.

4,879,742

CHARGING SYSTEM IN DATA COMMUNICATION NETWORK

Hidenobu Taniguchi, and Tatsuo Kawatobi, both of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 5, 1988, Ser. No. 228,983
Claims priority, application Japan, Aug. 10, 1987, 62-198064
Int. Cl.[4] H04M *15/00*
U.S. Cl. 379—111 **3 Claims**



1. A charging system in a data communication network comprising:

first means for negotiating, prior to effecting a data communication between a calling terminal and a called terminal via the network, a charge ratio between charges for the data communication to be paid by the calling and called terminals and allowing said calling terminal to initiate the data communication on an agreement between said calling terminal and said called terminal for the charge ratio;

second means for charging said calling terminal and said called terminal based on the charge ratios at a disconnection of the call; and

third means for respectively notifying the charge information to said calling terminal and said called terminal.

4,879,743

PBX AND ADJUNCT USING MULTI-FREQUENCY TONES FOR COMMUNICATION THEREBETWEEN

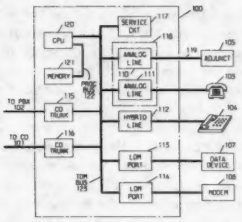
Edmund T. Burke, West Long Branch; Daniel H. Dawdy, Marlboro, and Timothy M. Rubert, W. Long Branch, all of N.J., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Information Systems Inc., Morristown, N.J.

Filed Oct. 3, 1988, Ser. No. 252,477
Int. Cl.[4] H04M *7/06*
U.S. Cl. 379—142 **20 Claims**

1. A controller for use in a communication system connected to a communication line for receiving incoming calls and connected to an adjunct over a station set communication facility, said controller comprising

means responsive to an incoming call addressed to said adjunct received over said line for sending a ringing signal over said station facility to said adjunct and

means responsive to an off-hook signal from said adjunct for outpulsing over said station facility to said adjunct a plurality of multifrequency tones containing information identifying the type of call to be completed to enable said adjunct to respond to said incoming call, said outpulsing



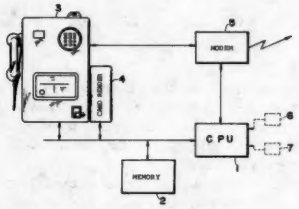
occurring prior to said controller connecting and incoming call to said adjunct.

4,879,744

CARD-OPERATED TELEPHONE

Hisashi Tasaki, and Kimikazu Endo, both of Kyoto, Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Continuation of Ser. No. 882,186, Jul. 7, 1986, abandoned. This application Jun. 28, 1988, Ser. No. 212,136
Claims priority, application Japan, Jul. 10, 1985, 60-150007
Int. Cl.[4] H04M *17/02*
U.S. Cl. 379—144 **7 Claims**



1. A card-operated telephone having a card reader for reading card data, which is inclusive of value, stored in a telephone card, which telephone permits a user to communicate within the limits of the value included in the card data and comprises:

means for determining whether the telephone card is being used a first time;

means for reading and storing dialing data in a case where the telephone card is being used a first time;

writing means for writing the stored dialing data into the telephone card at the end of communication in the case where the telephone card is being used a first time; and

automatic dialing means, operative when the telephone card is used other than a first time, for transmitting a dialing signal based on the dialing data read from the telephone card.

4,879,745

HALF-DUPLEX SPEAKERPHONE

Ygal Arbel, Sunnyvale, Calif., assignor to IBM Corporation, San Jose, Calif.

Filed Oct. 12, 1988, Ser. No. 253,610
Int. Cl.[4] H04M *1/60*
U.S. Cl. 379—389 **25 Claims**

14. A speakerphone including a transmit audio path for conveying, when active, a transmit signal including a speech signal and a receive audio path for conveying, when active, a

receive signal including a speech signal, the speakerphone comprising:

first means for generating an estimate of the power of the transmit signal;

second means for generating an estimate of a noise signal component associated with the transmit audio path;

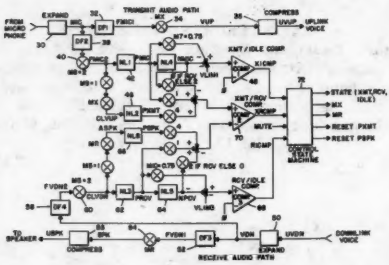
third means for generating an estimate of an echo signal component associated with the transmit audio path;

fourth means for generating an estimate of the power of the receive signal;

fifth means for generating an estimate of a noise signal component associated with the receive audio path;

sixth means for generating an estimate of an echo signal component associated with the receive audio path;

first means for comparing the estimate of the power of the transmit signal to the estimate of the noise signal for the transmit audio path, the first comparing means having an output for indicating if the transmit audio path is conveying speech signals;



second means for comparing the estimate of the power of the receive signal to the estimate of the noise signal for the receive audio path, the second comparing means having an output for indicating if the receive audio path is conveying speech signals;

third means for comparing the estimate of the transmit audio path signal power, noise signal and echo signal with the estimate of the receive audio path signal power, noise signal and echo signal, the third comparing means having an output for indicating whether the transmit audio path or the receive audio path is active; and

means, coupled to and responsive to the output of each of the first, the second and the third comparing means, for selecting at least a transmit state, wherein the transmit audio path is active, a receive state, wherein the receive audio path is active, or an idle state, wherein neither the transmit or the receive audio paths are active.

4,879,746

VOICE COMMUNICATION LINK INTERFACE APPARATUS

Robert F. Young, and Vladimir Kraz, both of Santa Cruz, Calif., assignors to Plantronics, Inc., Santa Cruz, Calif.

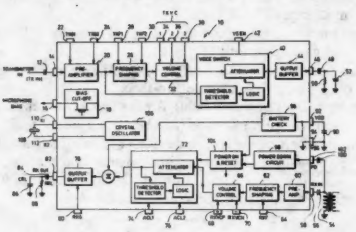
Filed Dec. 30, 1987, Ser. No. 139,853
Int. Cl.[4] H04M *1/60*
U.S. Cl. 379—399 **6 Claims**

1. Apparatus for interfacing a two-way voice communication instrument to a communication link, comprising:

a transmit signal channel to provide an electrical voice signal to the communication link; and

a receive signal channel to provide a received electrical voice signal to the communication instrument,

the receive signal channel including a circuit providing compression limiting to the received electrical voice signal as a function of the frequency and amplitude of the received electrical voice signal and a volume control circuit programmable to a preset gain within the total range of gain adjustment, said volume control providing



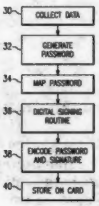
an increase in volume at a first rate and a reduction in volume at a second, faster rate.

4,879,747

METHOD AND SYSTEM FOR PERSONAL IDENTIFICATION

Frank T. Leighton, 965 Dedham St., Newton Center, Mass. 02159, and Silvio Micali, 224 Upland Rd., Cambridge, Mass. 02140

Filed Mar. 21, 1988, Ser. No. 170,734
Int. Cl.[4] H04K *1/00*
U.S. Cl. 380—23 **26 Claims**



1. A method for enabling an authorized user of a personal identification card to effect a transaction using a transaction terminal, comprising the steps of:

generating a first data string having a portion thereof which is derived from a physical characteristic of the authorized user and need not be retained secret;

mapping the first data string using a predetermined function F to generate a second data string Q having a length substantially less than the length of the first data string;

digitally signing the second data string with a private key of a public-key cryptosystem pair to generate a signature corresponding to the second data string, the public-key cryptosystem pair also having a public key M;

encoding the first data string and the signature to generate an encoded first data string/signature;

storing the encoded first data string/signature on the personal identification card;

receiving the personal identification card at the transaction terminal;

decoding the encoded first data string/signature on the received personal identification card to generate the first data string and a received signature;

mapping the first data string with the predetermined function F to generate the second data string;

digitally verifying, using the public key M of the public-key cryptosystem pair, whether the received signature can be generated from the second data string;

if the received signature can be generated from the second

data string using the public key, generating an indication that the received signature is valid;

generating a representation from the first data string; and

displaying the representation and the indication on a display of the transaction terminal to enable an operator thereof to verify that the user is authorized to effect a transaction using the personal identification card.

4,879,748

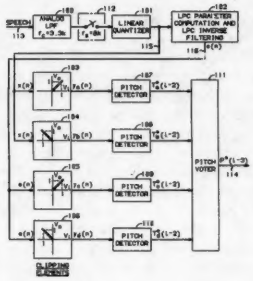
PARALLEL PROCESSING PITCH DETECTOR

Joseph Picone, Forest Park, and Dimitrios Prezas, Park Ridge, both of Ill., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 28, 1985, Ser. No. 770,633

Int. Cl.[4] G10L *7/02*

U.S. Cl. 381—49 **13 Claims**



1. A pitch detector system for human speech comprising:

means for storing a predetermined number of evenly spaced samples of instantaneous amplitude of said speech as a speech frame;

means for generating residual samples from said speech samples;

a plurality of identical means each responsive to an individual predetemined portion of said residual samples of said frame for estimating a pitch value of said frame;

another plurality of identical means each responsive to an individual predetermined portion of said speech samples of said frame for estimating a pitch value of said frame;

means for calculating a final pitch value from the estimated pitch values from each of said plurality and said other plurality of estimating means wherein an unvoiced speech frame is indicated by said calculated pitch value being equal to a predefined value and a voiced frame is indicated by said calculated pitch value being equal to a value other than said predefined value;

said calculating means comprises means responsive to all of said estimated pitch values having a value different than said predefined value for setting said calculated pitch value equal to the arithmetic average of a subset of said estimated pitch values, said subset comprising all of said estimated pitch values except the lowest magnitude value and the highest magnitude value;

means for constraining said final pitch value so that the calculated pitch value is consistent with calculated pitch values from previous frames;

said constraining means comprises means responsive to a first sequence of frames comprising a voiced frame and an unvoiced frame and a second voiced frame for generating a new calculated pitch value having an arithmetic relationship to the calculated pitch values of the frames of said first sequence;

said generating means comprises a new pitch value generating means responsive to a second sequence of frames comprising an unvoiced frame and a voiced frame and a second unvoiced frame for generating a new calculated value indicating an unvoiced frame; and

said new pitch value generating means further reponsive to a third sequence of frames comprising a voiced frame and a second voiced frame and a third voiced frame for generating a new calculated pitch value having an arithmetic relationship to the calculated pitch values of the frames of said third sequence.

4,879,749

HOST CONTROLLER FOR PROGRAMMABLE DIGITAL HEARING AID SYSTEM

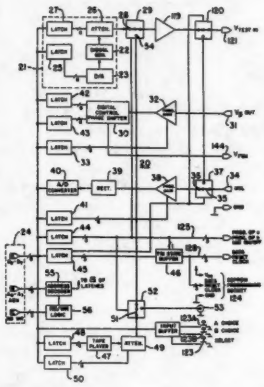
Harry Levitt, Livingston, N.J.; Richard S. Dugot, New York, N.Y., and Kenneth W. Kopper, River Edge, N.J., assignors to Audimax, Inc., Hackensack, N.J.

Division of Ser. No. 879,214, Jun. 26, 1986, Pat. No. 4,731,850.

This application Feb. 12, 1988, Ser. No. 155,374

Int. Cl.[4] H04R *29/00, 25/00*

U.S. Cl. 381—68.4 **6 Claims**



1. A host controller for producing data from a computer for a programmable hearing aid to cancel acoustic feedback comprising means for receiving signals from the hearing aid and measuring phase and amplitude, means for receiving signals from the hearing aid indicative of the summation of acoustic feedback and acoustic feedback cancellation signals, and means controlled by the computer for adjusting the phase and amplitude necessary to eliminate acoustic feedback and produce a null summation.

4,879,750

HEARING AID WITH CERUMEN TRAPPING GAP

Peter Nassler, Eckental, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 11, 1985, Ser. No. 807,893

Claims priority, application Fed. Rep. of Germany, Dec. 15, 1984, 8436783[U]; Feb. 20, 1985, 8504765[U]

Int. Cl.[4] H04R *25/00, 25/02*

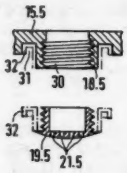
U.S. Cl. 381—68.6 **13 Claims**

1. A hearing aid of the type in which, during use, an earpiece closes off the ear canal and a distal end of a sound-conducting tube extends into the auditory meatus, and in which the tube is mounted to the earpiece, the hearing aid comprising:

a protrusion surrounding said distal end and extending from said earpiece; and

a cap detachably secured to said protrusion, said cap being perforated to permit sound to travel into the ear and

wherein said cap and said earpiece form a cerumen-trapping gap;



wherein said earpiece of said hearing aid has a substantially flat end plate adjacent said protrusion and said end plate bears a groove which surrounds said protrusion.

4,879,751

AUDIO PRODUCTION CONSOLE

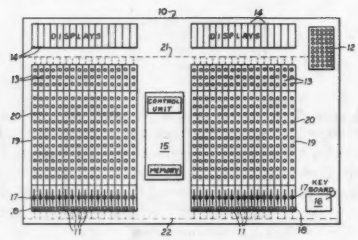
Nicholas Franks, Wilmslow, and Graham A. Langley, Knutsford, both of England, assignors to Amek Systems & Controls Limited, Salford, England

Filed Jun. 24, 1987, Ser. No. 65,877

Claims priority, application United Kingdom, Jun. 27, 1986, 8615758; Nov. 13, 1986, 8627191

Int. Cl.[4] H04B *1/00*

U.S. Cl. 381—119 **12 Claims**



1. An audio production console, comprising:

a plurality of inputs;

at least one output bus;

a plurality of separate identical input modules, each of said input modules being connected between a corresponding one of said inputs and said at least one output bus, each of said input modules comprising a plurality of circuit means and a plurality of switching means, said plurality of circuit means and said plurality of switching means being interconnected so as to define a plurality of potential signal paths with the corresponding input module between said plurality of circuit means for a signal from a corresponding one of said inputs, each of said plurality of circuit means being for modifying the audio characteristics of an audio signal from said corresponding input; and

a common control means for all of said plurality of input modules, which control means controls said switching means so as to select at least one of said plurality of potential signal paths as at least one actual signal path of said audio signal from said corresponding input.

4,879,752

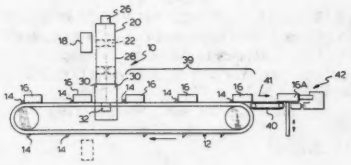
LUMBER OPTIMIZER

Jan E. Aune; Terence J. Arden, and Mary S. Yap, all of Vancouver, Canada, assignors to MacMillan Bloedel Limited

Filed Nov. 18, 1987, Ser. No. 122,336

Int. Cl.[4] G06K *9/78*

U.S. Cl. 382—1 **14 Claims**



1. A lumber optimizer system comprising a conveyor means for transporting flitches on a path of travel through said system, a profiling station having optical sensing means to generate a signal defining the profile of each said flitch as each said flitch is transported through said profiling station by said conveyor means, a data acquisition station having means for directing a line of X-rays extending substantially across said path and from one side to an opposite side of each said flitch as said flitch traverses said line, said x-rays passing through each said flitch as each said flitch is moved through said data acquisition station by said conveyor means and discrete side by side means for locally sensing the amount of said x-rays passing through each said flitch along said line thereby to provide data indicating the densities of local areas of each said flitch along said line, means forming a density map of said densities of substantially all said local areas of each said flitch from said data, image analysis means to analyze said density map to discriminate defects including knots in said flitch and to determine the size and location of said defects in said flitch, means for to determine a sawing solution based on size and location of said defects in said flitch as determined by said image analysis means, and on said signal defining the profile of each said flitch from said optical sensing means, a sawing means, means to adjust said sawing means in accordance with said sawing solution so generated for each said flitch, a flitch positioning means, and means to adjust said flitch positioning means to orient each said flitch relative to said sawing means as determined by said sawing solution for each respective said flitch.

4,879,753

THRESHOLDING ALGORITHM SELECTION APPARATUS

Ahmed M. El-Sherbini, Giza, Egypt, assignor to Wang Laboratories, Inc., Lowell, Mass.

Continuation of Ser. No. 846,376, Mar. 31, 1986. This application Sep. 16, 1988, Ser. No. 246,940

Int. Cl.[4] G06K *9/00*

U.S. Cl. 382—50 **6 Claims**

1. An image digitizer comprising:

(A) a preliminary thresholder for receiving signals representing the optical intensity of pixels of an image and producing a preliminary binary bitmap representation of the image suitable for discrimination between text and grey scale image;

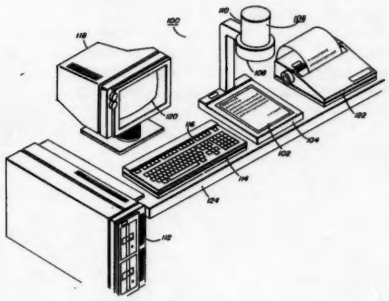
(B) a text thresholder for receiving signals representing the optical intensity of pixels of the image to be digitized and producing a binary bitmap representation of the imge according to a text thresholding algorithm;

(C) a grey scale imge thresholder for receiving signals representing the optical intensity of pixels of the image and producing a binary bitmap representation of the image according to a grey scale image thresholding algorithm; and

(D) thresholder selection means

(a) for computing from the preliminary binary bitmap an average run length for each of a plurality of regions of the image,

(b) for comparing the computed average run length of each region with a predetermined run length threshold



to categorize each region as either a text type or a grey scale type image,

(c) for causing the text thresholder to be applied to regions of the image determined to be of the text type, and

(d) for causing the grey scale image thresholder to be applied to regions of the image determined to be of the grey scale type.

4,879,754

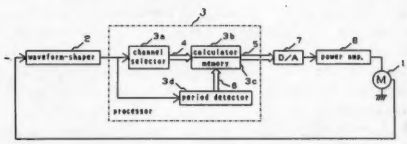
SPEED CONTROLLER

Kunihira Tadashi, Osaka, and Hiroshi Minakuchi, Shiga, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 14, 1989, Ser. No. 324,039

Int. Cl.[4] H02P *5/16*

U.S. Cl. 388—810 **10 Claims**



1. A speed controller comprising:

period detecting means for detecting a period of alternating-current (AC) signal containing information of a rotational speed of a rotating object;

memory means for storing the detected period value detected by said period detecting means;

calculation means for calculating an error output from said detected period value and a reference speed value;

driving means for supplying said rotating object with a driving power based on said error output; and

correction-value computing means for computing a correction value from two continuous detected period values stored in said memory and the reference speed value.

4,879,755

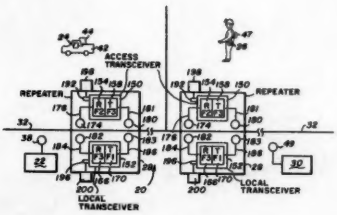
MEDIUM FREQUENCY MINE COMMUNICATION SYSTEM

Larry G. Stolarczyk, Raton; Kurt A. Smoker, Las Cruces; Gerald J. Boese, Raton; William E. Mondt, Albuquerque; Marvin L. Hasenack, Jr., Raton, all of N. Mex.; James L. Zappanti, Trinidad, Colo.; Seth A. Smith, and Edward D. Moore, both of Raton, N. Mex., assignors to Stolar, Inc., Raton, N. Mex.

Filed May 29, 1987, Ser. No. 56,559

Int. Cl.[4] H04B *13/02*

U.S. Cl. 455—3 **24 Claims**



1. A method for communicating in mines which comprises:

a. inductively coupling a first radio and a second radio to a transmission line electrical conductor that extends into a mine, the first radio and the second radio each including a receiver for receiving one frequency F1 and a transmitter for transmitting on at least one frequency F2 different from said frequency F1 with the frequencies F1 and F2 both lying in the medium frequency range;

b. inductively coupling at least one access transceiver to said transmission line electrical conductor, the access transceiver having a receiver for said frequency F2 and a transmitter for transmitting a frequency F3 different from said frequencies F1 and F2;

c. inductively coupling at least one local transceiver to said transmission line electrical conductor within said mine, the local transceiver having a receiver for receiving said frequency F3 and a transmitter for transmitting said frequency F1;

d transmitting a first signal carrying information to be communicated from the first radio on the frequency F2;

e. receiving said first signal at said access transceiver;

f. retransmitting said first signal from said access transceiver on the frequency F3 as a second signal carrying said information to be communicated;

g. receiving said second signal at at least one of said local transceivers;

h. retransmitting said second signal from said local transceiver on the frequency F1 as a third signal carrying said information to be communicated; and

i. receiving said third signal at said receiver of said second radio whereby said information to be communicated is conveyed from said first radio to said second radio.

4,879,756

RADIO BROADCAST COMMUNICATION SYSTEMS

John K. Stevens, 8 Alexander Street, Brampton, Ontario, Canada (L6V 1T0), and Paul I. Waterhouse, 8 Main Street, Lynden, Ontario, Canada (L0R 1T0)

Division of Ser. No. 909,548, Sep. 22, 1986, Pat. No. 4,821,291. This application Jan. 6, 1988, Ser. No. 141,242

Int. Cl.[4] H04B *7/24;* H04Q *7/00*

U.S. Cl. 455—39 **15 Claims**

1. A radio broadcast system comprising a base broadcast transmitter/receiver and at least one module broadcast receiver/transmitter comprising:

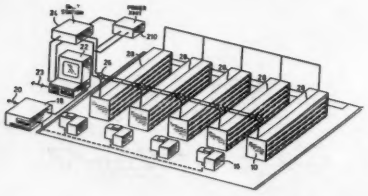
means for generating at the base transmitter/receiver a

reference carrier in the form of sequential discrete envelopes thereof, each of duration of a predetermined period, and for transmitting the reference carrier to each module broadcast receiver/transmitter;

means for generating at the base transmitter/receiver a base data word within the period of a respective envelope and for transmitting the base data word to the module receiver/transmitter within the period of the respective envelope;

means in the module receiver/transmitter for receiving each reference carrier discrete envelope and in response thereto enable the module receiver/transmitter for operation with the base data word, for generating a corresponding module data word to be transmitted, for receiving the base data word, and for generating in response to reception of the base data word a timing period which is interposed between the received base data word and the module data word to be transmitted, and which is of length such that the corresponding module data word is also within the same envelope period as the received base data word; and

means in the module transmitter/receiver for transmitting the module data word for reception by the base broadcast transmitter/receiver upon termination of the said timing period.

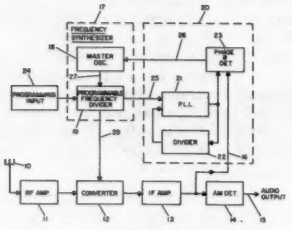


4,879,757

TWEET ELIMINATION, OR REDUCTION, IN SUPERHETERODYNE RECEIVERS

Bernard D. Loughlin, Centerport, N.Y., assignor to Hazeltine Corp., Greenlawn, N.Y.

Filed May 7, 1987, Ser. No. 46,754
Int. Cl.[4] H04B 1/16
U.S. Cl. 455—182 **6 Claims**



1. In a superheterodyne receiver, having a predetermined intermediate frequency (IF) band and a nominal IF, apparatus for preventing or reducing an undesirable frequency relation which may exist between a received radio frequency (RF) signal and the resulting actual IF signal, comprising:

first means for supplying a local oscillator (LO) signal at selected different nominal frequencies and whose specific actual frequency can be controlled, and for also supplying a second signal representative of the nominal IF of said receiver, said LO signal and said second signal being derived from a single master oscillator;

second means for supplying a received RF signal;

third means for combining said RF signal and said LO signal to develop an IF signal within said IF band;

fourth means, responsive to said second signal and to said IF signal, for developing a control signal representative of the existance of said undesirable frequency relation between said RF signal and said IF signal;

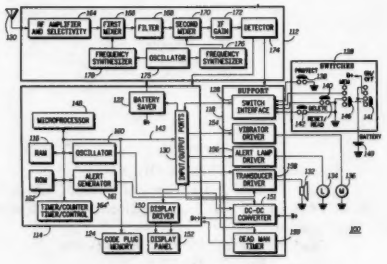
and means for applying said control signal to said first means, for controlling the frequency of said master oscillator, and therefore said LO signal, so as to prevent or reduce said undesirable frequency relation.

4,879,758

COMMUNICATION RECEIVER SYSTEM HAVING A DECODER OPERATING AT VARIABLE FREQUENCIES

Michael J. DeLuca, Boca Raton, and Jeffrey B. Reed, Lake Worth, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 2, 1987, Ser. No. 276
Int. Cl.[4] H04B 1/10
U.S. Cl. 455—296 **27 Claims**



1. A method for minimizing spurious interference signals generated in a receiver receiving an information signal modulated upon one of a plurality of carrier frequencies, the receiver including

a frequency receiving means for receiving and demodulation information modulated upon at least one carrier frequency,

information processing means for processing the demodulated information signal, and

an oscillator for providing a clock signal for said information processing means, the clock signal having a selectable clock frequency, wherein the spurious interfering signals are generated by said information processing means and are a function of the frequency of the clock signal, said method comprising the steps of:

(a) determining a clock frequency corresponding to a carrier frequency wherein the spurious interfering signals are reduced;

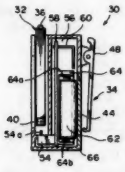
(b) determining the carrier frequency of the frequency receiving means; and

(c) selecting the clock frequency corresponding to the determined carrier frequency.

4,879,759
HOLDING STRUCTURE FOR A PAGING RECEIVER HAVING EXTRA FUNCTIONS

Takeshi Matsumoto; Takashi Oyamada, and Sigeki Hayasaka, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Jan. 11, 1988, Ser. No. 141,747
Claims priority, application Japan, Jan. 8, 1987, 62-1580[U]; Jan. 26, 1987, 62-10336[U]; Aug. 28, 1987, 62-131782
Int. Cl.⁴ H04B *1/08*
U.S. Cl. 455—348 **21 Claims**



1. A holding structure for holding a paging receiver comprising:

receiver housing means accommodating a thin body portion of said receiver which is made up of at least a receiver section, an antenna section, speaker section and a battery section; and

extra function adding means electrically and mechanically connectable to said body portion of said receiver for selectively adding a plurality of extra functions to said paging receiver;

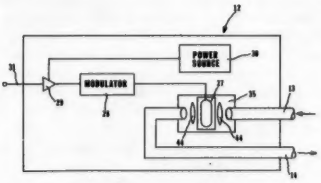
said receiver housing means comprising a housing member, a first electrical connecting member provided in said housing member and first locking means provided in said housing member;

said extra function adding means comprising a support member, a second electrical connecting member connectable to said first connecting member, second locking means engageable with said first locking means, and guide members for individually guiding opposite side walls of said housing member when said body of said receiver is connected to said extra function adding means.

4,879,760
OPTICAL FIBER TRANSMISSIVE SIGNAL MODULATION SYSTEM

Mark W. Kroll, Minnetonka, and Mark R. Pommrehn, Eden Prairie, both of Minn., assignors to Cherne Medical, Inc., Minneapolis, Minn.

Filed Jun. 10, 1987, Ser. No. 60,741
Int. Cl.⁴ H04B *9/00*
U.S. Cl. 455—605 **17 Claims**



1. A signal modulation system comprising:

a. first and second optical fibers;

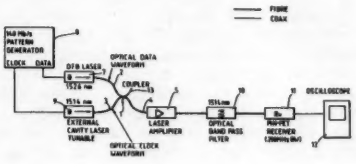
b. first station communicatively connected to said first and said second optical fibers and having means to transmit an unmodulated light carrier signal through said first optical fiber and first means to convert a modulated light signal from said second optical fiber to a demodulated electrical signal for output; and

c. a second station communicatively connected to said first and said second optical fibers and having means to receive an input signal, a power source connected to said means to receive, second means to convert said input signal to a modulating signal, an electro-optical modulator constructed and arranged to modulate transmission of said unmodulated light carrier signal from said first optical fiber to said second optical fiber, said electro-optical modulator being responsive to said modulating signal, and means to direct said unmodulated light carrier signal emitted from said first optical fiber to said electro-optical modulator for transmission to said second optical fiber, said power source comprising one or more transparent photovoltaic batteries disposed in-line with and between said first optical fiber and said electro-optical modulator.

4,879,761
BISTABLE OPTICALLY CLOCKED OPTICAL SIGNAL REGENERATOR

Roderick P. Webb, Woodbridge, England, assignor to British Telecommunications, plc, London, England

PCT No. PCT/GB87/00360, § 371 Date Jan. 19, 1988, § 102(e) Date Jan. 19, 1988, PCT Pub. No. WO87/07458, PCT Pub. Date Dec. 3, 1987
PCT Filed May 26, 1987, Ser. No. 143,857
Claims priority, application United Kingdom, May 28, 1986, 8612956
Int. Cl.⁴ H04B *9/00*
U.S. Cl. 455—601 **8 Claims**



1. An optical signal regenerator comprising:

an optical coupler having a first input for an optical information signal, a second input for optical clock pulses and an output for a combined signal,

an optical clock signal generator which generates the optical clock pulses and applies them to the second input and including power control means which controls the power of the optical clock pulses to a level just below the bistable threshold of the laser amplifier;

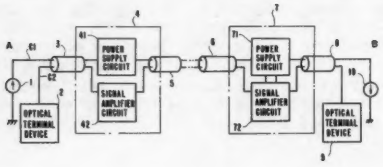
a resonant laser amplifier located downstream of the output of the coupler and arranged to receive the combined signal and, in use, output a regenerated optical information signal; and

means for applying a bias current to the laser amplifier, in use, biasing the amplifier to a level below its lasing threshold with the power of the optical clock pulses being just below the bistable threshold of the amplifier, so that, when an optical information signal is fed into the first input during the application of an optical clock pulse to the second input the bistable threshold of the amplifier is exceeded causing a sudden jump in the power of the optical output of the amplifier to provide a regenerated optical information signal.

4,879,762
OPTICAL REPEATER AND REGULATED CURRENT FEEDING SYSTEM FOR THE SAME

Ken Hanyuda, Yokohama, and Michimasa Ohara, Kawasaki, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 21, 1986, Ser. No. 933,114
Claims priority, application Japan, Nov. 25, 1985, 60-262461
Int. Cl.[4] H04B 9/00
U.S. Cl. 455—601 6 Claims



1. An optical repeater, having an input and an output, which is coupled to an optical transmission line formed by an optical fiber and a conductor, said optical repeater comprising:

an electrical circuit including:

means for converting a first optical signal, received at the input of said optical repeater, to an electrical signal;

means for amplifying the electrical signal;

means for converting the amplified electrical signal to a second optical signal; and

means for transmitting the second optical signal from the output of said optical repeater; and

power supply means for supplying power to said electrical circuit directly connected in series with the conductor including:

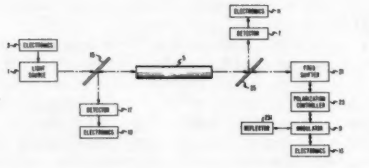
means for receiving a regulated DC current signal directly from the conductor; and

means for dropping the voltage and raising the current of the regulated DC current signal, and for supplying a DC current signal, having a current higher than the current of the regulated DC current signal, to said electrical circuit, said means for dropping comprising a switched capacitor circuit having an input connected to said conductor and an output connected to said electrical circuit, producing a voltage on the output lower than the voltage on the input, and a current on the output higher than the current of the regulated DC current signal.

4,879,763
OPTICAL FIBER BIDIRECTIONAL TRANSMISSION SYSTEM

Thomas H. Wood, Highlands, N.J., assignor to AT&T Bell laboratories American Telephone and Telegraph Company, New York, N.Y.

Filed Feb. 21, 1986, Ser. No. 832,153
Int. Cl.[4] H04B 9/00
U.S. Cl. 455—607 10 Claims



1. An optical communication system comprising a first terminal, a second terminal, and an optical fiber for optically connecting said first terminal to said second terminal;

said first terminal comprising a light source for generating optical signals to be launched into said optical fiber and a first photodetector for receiving optical signals from said optical fiber;

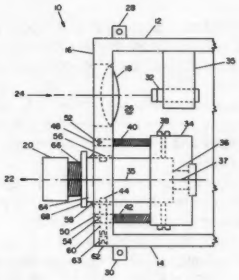
said second terminal comprising a second photodetector for receiving optical signals from said optical fiber, means for modulating optical signals from a reflector means to be launched into said optical fiber, and said reflector means for reflecting optical signals received from said light source via said means for modulating back into said means for modulating; and

at least one of said terminals comprises means for performing a predetermined translation of said optical signals to be launched into said optical fiber to reduce coherent Rayleigh noise.

4,879,764
APPARATUS AND METHOD FOR ALIGNMENT OF FIXED COMMUNICATION LASER STATIONS

Richard K. Walter, Manheim, Pa., assignor to Laser Communications, Inc., Lancaster, Pa.

Filed May 28, 1987, Ser. No. 55,128
Int. Cl.[4] H04B 9/00
U.S. Cl. 455—607 4 Claims



1. An apparatus for alignment of a laser beam transmitted from a fixed laser transmitting-receiving station so that the transmitted beam can be made parallel to a beam received by the same station, comprising:

a mounting plate;

a laser source attached to the mounting plate by a means preventing relative movement between the laser source and the mounting plate;

a lens attached to the mounting plate by a means preventing relative movement between the lens and the mounting plate, with the lens oriented so that its centerline is parallel to and centered upon a beam generated by the laser source, and with the lens projecting from one face of the mounting plate;

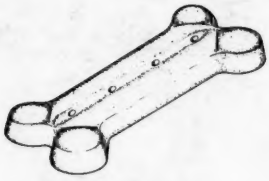
a support surface which forms part of the outside surface of the laser transmitting-receiving station, the support surface being rigidly attached to a station support means, and the support surface including a clearance hole through which the lens penetrates, a pivot means attached to the support surface and engaging the lens, and at least two threaded through holes; and

at least two threaded rods each with one end screwed into the threaded holes in the support surface and the other end projecting toward and contacting the mounting plate, with the end within the threaded hole containing a means by which to turn the threaded rod, the turning means being accessible from outside the laser transmitting-receiving station.

DESIGNS

NOVEMBER 7, 1989

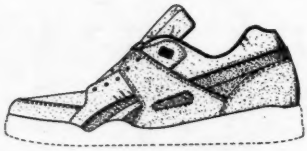
304,385
CANINE BISCUIT
Albert Spiel, Yonkers, N.Y., and Henry C. Spanier, Milford, N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.
Filed Jan. 5, 1987, Ser. No. 951
Term of patent 14 years
U.S. Cl. D1—106

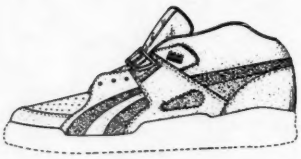


304,386
SKI BOOT
Shin-ichi Iwama, Higashi-kurume, Japan, assignor to Daiwa Seiko, Inc., Tokyo, Japan
Filed Jul. 20, 1987, Ser. No. 75,077
Claims priority, application Japan, Jan. 27, 1987, 62-2889
Term of patent 14 years
U.S. Cl. D2—276

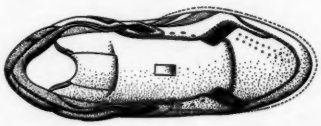
304,387
SHOE UPPER
Paul D. Brown, Hingham, Mass., assignor to Reebok International Ltd., Canton, Mass.
Filed Sep. 12, 1988, Ser. No. 242,503
Term of patent 14 years
U.S. Cl. D2—314

304,388
SHOE UPPER
Paul D. Brown, Hingham, Mass., assignor to Reebok International Ltd., Stoughton, Mass.
Filed Feb. 8, 1989, Ser. No. 307,571
Term of patent 14 years
U.S. Cl. D2—314



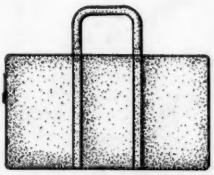


304,389
SHOE UPPER
David E. Miller, Carver, Mass., assignor to Reebok International Ltd., Canton, Mass.
Filed Feb. 8, 1989, Ser. No. 307,572
Term of patent 14 years
U.S. Cl. D2—314

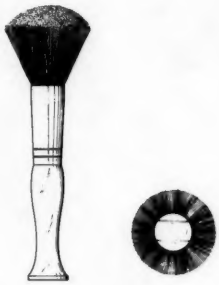


304,390
SHOE SOLE
Kiyotaka Nakano, Kurume, Japan, assignor to Nippon Rubber Co., Ltd., Tokyo, Japan
Filed Feb. 10, 1987, Ser. No. 13,266
Claims priority, application Japan, Sep. 5, 1986, 61-35301
Term of patent 14 years
U.S. Cl. D2—320

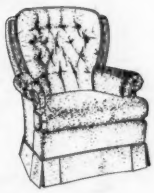
304,391
CARRYING CASE
Daniel J. Brunell, Spotswood, N.J., assignor to E.C. Leather Goods, Inc., Cranbury, N.J.
Filed Jun. 4, 1986, Ser. No. 870,697
Term of patent 14 years
U.S. Cl. D3—71



304,392
COSMETIC BRUSH
Maurice M. Reich, 19 Gathering Rd., Pine Brook, N.J. 07058
Filed Feb. 27, 1989, Ser. No. 316,313
Term of patent 14 years
U.S. Cl. D4—135



304,393
SWIVEL ROCKER
Clement M. Lange, Jr., Huntingburg, Ind., assignor to Best Chairs, Inc., Ferdinand, Ind.
Filed Mar. 1, 1988, Ser. No. 162,471
Term of patent 14 years
U.S. Cl. D6—334



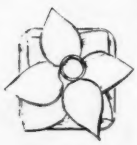
304,394
CHAIR/LOUNGE
Warren E. Harmer, Eastwood, Australia, assignor to W. E. Harmer Associates Pty. Ltd., Eastwood, Australia
Filed Jan. 12, 1988, Ser. No. 143,593
Term of patent 14 years
U.S. Cl. D6—361

304,395

FLORAL DISPLAY STAND

Vernon R. Taylor, 5108 Eleventh St., Northeast, Washington, D.C. 20011

Filed Sep. 18, 1986, Ser. No. 908,682
Term of patent 14 years
U.S. Cl. D6—405

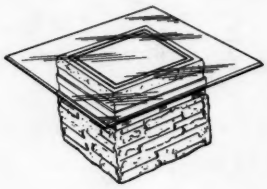


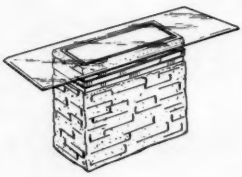
304,396

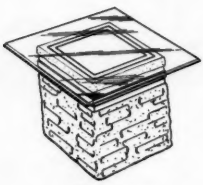
TABLE

Steven J. Pitchersky, 4509 Kenbridge Dr., Greensboro, N.C. 27410, and Edwin Goldstein, 160 Overbrook Ave., Hackensack, N.J. 06041, assignors to Steven J. Pitchersky, Greensboro, N.C. and Edwin Goldstein, Hackensark, N.J.

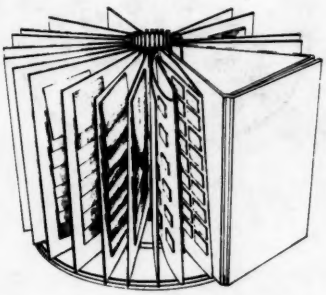
Filed Apr. 14, 1989, Ser. No. 338,132
Term of patent 14 years
U.S. Cl. D6—451

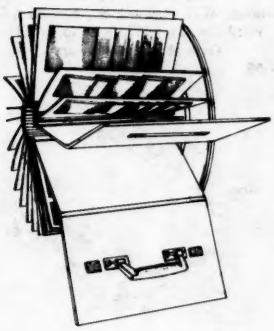




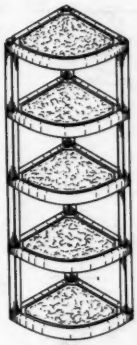


304,397
DISPLAY STAND
Jeffrey Wright, and Judith L. Hvizdak, both of 1608 E. Second St., Scotch Plains, N.J. 07076
Filed May 19, 1986, Ser. No. 864,881
Term of patent 14 years
U.S. Cl. D6—454



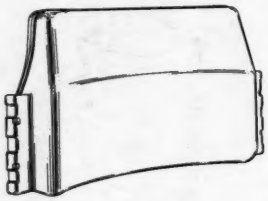


304,398
CORNER UNIT
Charles R. Goetz, Carnegie, Pa., assignor to Alco Industries, Inc., Valley Forge, Pa.
Filed Sep. 3, 1986, Ser. No. 903,578
Term of patent 14 years
U.S. Cl. D6—479

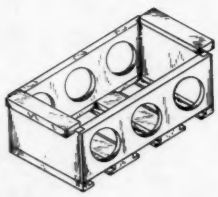


304,399
CHAIR BASE WITH CASTERS
Jerome C. Caruso, Lake Forest, Ill.; Ludovic A. Perl, North York, Canada, and Robert M. Shane, Berrien Springs, Mich., assignors to Shepherd Products U.S., Inc., St. Joseph, Mich.
Filed Jul. 27, 1987, Ser. No. 78,476
Term of patent 14 years
U.S. Cl. D6—498

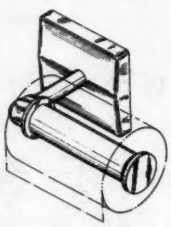
304,400
BACK FOR A STADIUM SEAT
Wilmer R. Schultz, 584 Pine St., Emmaus, Pa. 18049
Filed Nov. 5, 1986, Ser. No. 927,417
Term of patent 14 years
U.S. Cl. D6—502



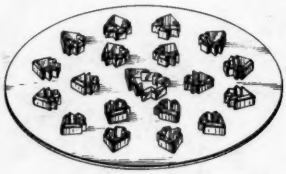
304,401
COMBINED WINE AND GLASS RACK
Leonard A. Wagner, 1903-B Peppertree St., Durham, N.C. 27705
Filed Jan. 20, 1987, Ser. No. 4,698
Term of patent 14 years
U.S. Cl. D6—514



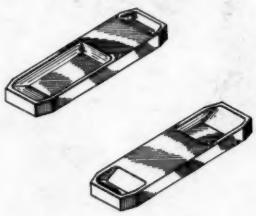
304,402
PAPER DISPENSER
James R. Van Hoose, 7721 Hartly Rd., Vacaville, Calif. 95688
Filed Sep. 23, 1987, Ser. No. 99,988
Term of patent 14 years
U.S. Cl. D6—523



304,403
CUTTER FOR PIE TOP DOUGH
Joan P. Wolff, Harrison, N.Y., assignor to Rowoco Inc., Elmsford, N.Y.
Filed Feb. 13, 1987, Ser. No. 14,643
Term of patent 14 years
U.S. Cl. D7—43



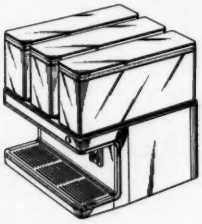
304,404
MEASURING SPOON
William E. Bounds, 3737 W. 240th St., Torrance, Calif. 90505
Filed Jan. 21, 1987, Ser. No. 5,738
Term of patent 14 years
U.S. Cl. D7—50



304,405
PITA BREAD SANDWICH HOLDER
Lois B. Levick, 32 Savoy Rd., Framingham, Mass. 01701
Filed Apr. 7, 1986, Ser. No. 850,884
Term of patent 14 years
U.S. Cl. D7—70

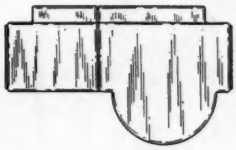
304,406
HANDLE FOR KITCHEN UTENSIL
Jane Ancona, and Bruce Ancona, both of New York, N.Y., assignors to M. Kamenstein, Inc., White Plains, N.Y.
Filed Dec. 22, 1988, Ser. No. 290,084
Term of patent 14 years
U.S. Cl. D7—152

304,407
BEVERAGE DISPENSER
Gregory Fossella, Boston, Mass., assignor to Jet Spray Corp., Norwood, Mass.
Filed Jun. 12, 1986, Ser. No. 873,338
Term of patent 14 years
U.S. Cl. D7—308

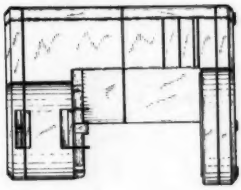


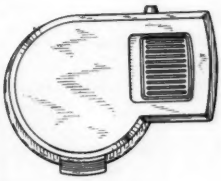
304,408
COFFEE MAKER
Aloysius J. M. Beeren, Haren, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Sep. 10, 1986, Ser. No. 905,992
Claims priority, application Benelux, Mar. 13, 1986, 60944-00
Term of patent 14 years
U.S. Cl. D7—309

304,409
COFFEEMAKER
Aloysius J. M. Beeren, Haren, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Oct. 16, 1986, Ser. No. 919,928
Claims priority, application Benelux, Apr. 23, 1986, 61047-01
Term of patent 14 years
U.S. Cl. D7—309

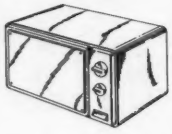


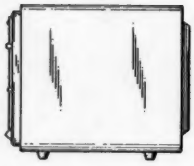
304,410
COFFEE MAKER
Masao Tsuji, Old Lyme, Conn., assignor to North American Philips Corp., New York, N.Y.
Filed Dec. 17, 1986, Ser. No. 943,287
Term of patent 14 years
U.S. Cl. D7—309



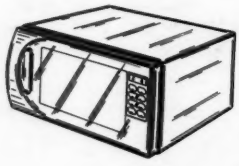


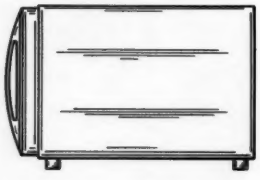
304,411
MICROWAVE OVEN
Seung H. Yoo, Buchon, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea
Filed Feb. 18, 1987, Ser. No. 16,177
Claims priority, application Rep. of Korea, Aug. 27, 1986, Des. 86-12209
Term of patent 14 years
U.S. Cl. D7—351



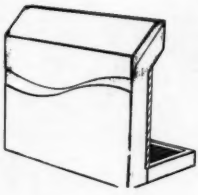


304,412
MICROWAVE OVEN
Hiroshi Nishibori, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Jul. 27, 1987, Ser. No. 78,473
Claims priority, application Japan, Feb. 19, 1987, 62-6391
Term of patent 14 years
U.S. Cl. D7—351





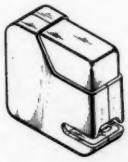
304,413
TOWER FOR A BEVERAGE DISPENSER
Alvin H. Schechter, New York, N.Y., and Carl R. Thompson, Stratford, Conn., assignors to The Coca-Cola Company, Atlanta, Ga.
Division of Ser. No. 841,750, Mar. 5, 1986. This application Nov. 3, 1988, Ser. No. 266,746
Term of patent 14 years
U.S. Cl. D7—397



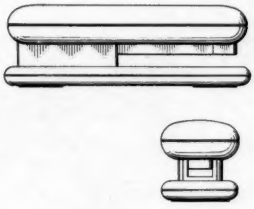
304,414
CAN OPENER
Ronald Ely, 2136 Boundary, San Diego, Calif. 92104
Filed Mar. 16, 1987, Ser. No. 25,999
Term of patent 14 years
U.S. Cl. D8—18

304,415
PAINT CAN RIM PIERCER
James L. Regan, P.O. Box 1176, Fairbanks, Ak.
Filed Mar. 19, 1987, Ser. No. 28,081
Term of patent 14 years
U.S. Cl. D8—18

304,416
STAPLER
Shintaro Tanigami, Tokyo, Japan, assignor to Elm Industry Co., Tokyo, Japan
Filed Oct. 27, 1986, Ser. No. 923,700
Claims priority, application Japan, May 31, 1986, 61-20944
Term of patent 14 years
U.S. Cl. D8—49



304,417
STAPLER
Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.
Filed May 26, 1987, Ser. No. 54,362
Term of patent 14 years
U.S. Cl. D8—50

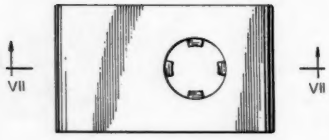


304,418
SCISSORS
Shintaro Tsuji, Tokyo, Japan, assignor to Sanrio Company, Ltd., Tokyo, Japan
Filed Apr. 16, 1987, Ser. No. 39,596
Claims priority, application Japan, Oct. 18, 1986, 61-041136[U]
Term of patent 14 years
U.S. Cl. D8—57

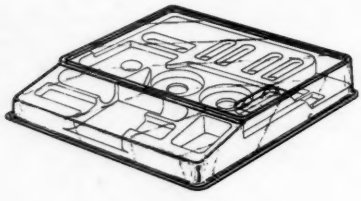
304,419
ANGULARLY ADJUSTABLE PNEUMATIC HAMMER
Rex P. Henck, and Loral A. Henck, both of 1321 E. 59th St., Kansas City, Mo. 64110
Filed Aug. 8, 1986, Ser. No. 894,822
Term of patent 14 years
U.S. Cl. D8—61

304,420
PALETTE KNIFE
William Alexander, Nanaimo, Canada, assignor to W. Alexander Magic Art Supplies, Inc., Salem, Oreg.
Filed May 18, 1987, Ser. No. 51,125
Term of patent 14 years
U.S. Cl. D8—98

304,421
EXTENSION TUBE CLIP
Gary J. Holdaway, North Rocks, Australia, assignor to Hawker Pacific Pty. Limited, North Rocks, Australia
Filed May 12, 1986, Ser. No. 862,600
Claims priority, application Australia, Nov. 15, 1985, 3250/85
Term of patent 14 years
U.S. Cl. D8—373

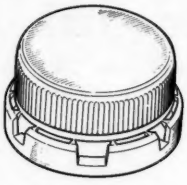


304,422
PLATFORM CONTAINER WITH TRANSPARENT LID
Robert D. Holewinski, Lakehurst, N.J., assignor to Johnson & Johnson Consumer Products, Inc., New Brunswick, N.J.
Filed Mar. 10, 1986, Ser. No. 842,047
Term of patent 14 years
U.S. Cl. D9—347

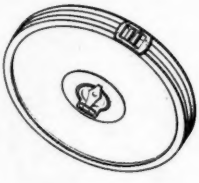


304,423
CONTAINER BODY FOR LIQUIDS OR THE LIKE
Ted L. Beaver, Roselle, Ill., assignor to Continental Plastic Containers, Inc., Norwalk, Conn.
Filed Sep. 8, 1986, Ser. No. 905,052
Term of patent 14 years
U.S. Cl. D9—376

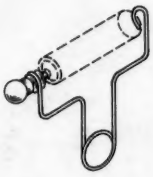
304,424
TAMPER PROOF CONTAINER CLOSURE
Robert J. Dawson, Victoria, Australia, assignor to Dawson Electrics Pty. Ltd., Victoria, Australia
Filed Jan. 27, 1986, Ser. No. 822,527
Claims priority, application Australia, Jul. 30, 1985, 2027/85
Term of patent 14 years
U.S. Cl. D9—453



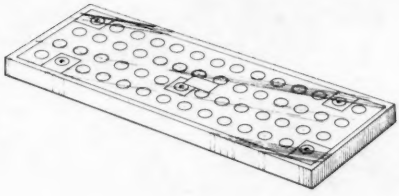
304,425
TAPE MEASURE CASE
Koichi Hara, 30, Sangayama-cho, and Akira Hara, 1250-25, Katsuragi-cho, both of Kishiwada-shi, Osaka, Japan
Filed Oct. 17, 1986, Ser. No. 920,349
Term of patent 14 years
U.S. Cl. D10—12



304,426
BATTERY TESTER
Donald C. Bergstedt, 2043 Magnolia Ave., Petaluma, Calif. 94952
Filed Jul. 25, 1986, Ser. No. 889,261
Term of patent 14 years
U.S. Cl. D10—77



304,427
HARDNESS TESTING BLOCK
Ernest Biddle, Rosemont, Pa., assignor to King Tester Corporation, King of Prussia, Pa.
Filed Oct. 31, 1986, Ser. No. 926,233
Term of patent 14 years
U.S. Cl. D10—83



304,428
DOMESTIC SCALE
Glen D. Kemnitz, Laurel, Miss., assignor to Sunbeam Corporation, Downers Grove, Ill.
Filed Nov. 14, 1986, Ser. No. 931,456
Term of patent 14 years
U.S. Cl. D10—92

304,429
WATCH FACE
Martin Hirschhorn, Holmdel, N.J., assignor to Time in Motion, Inc., Freehold, N.J.
Filed Oct. 27, 1986, Ser. No. 923,686
Term of patent 14 years
U.S. Cl. D10—126

304,430
BRACELET
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Apr. 30, 1987, Ser. No. 44,115
Claims priority, application Italy, Oct. 31, 1986, 3621/86[U]
Term of patent 14 years
U.S. Cl. D11—6

304,431
EXPANSION BRACELET
Murray L. Cowan, Norwood, Mass., assignor to Textron Inc., Providence, R.I.
Filed Jul. 20, 1987, Ser. No. 77,404
Term of patent 14 years
U.S. Cl. D11—25

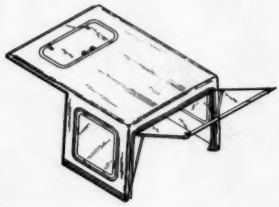
304,432
EXPANSION BRACELET
Murray L. Cowen, Norwood, Mass., assignor to Textron Inc., Providence, R.I.
Filed Jul. 20, 1987, Ser. No. 77,405
Term of patent 14 years
U.S. Cl. D11—25

304,433
EARRING
Theo McConnell, Jr., 706 7th St., Pitcairn, Pa. 15140
Filed Sep. 22, 1986, Ser. No. 910,444
Term of patent 14 years
U.S. Cl. D11—78

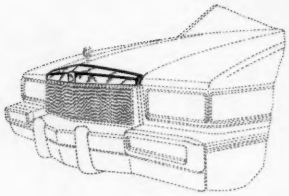
304,434
VEHICLE TIRE
Georg Schüller, Vienna, Austria, assignor to Semperit Reifen Aktiengesellschaft, Vienna, Austria
Filed Mar. 9, 1987, Ser. No. 23,269
Claims priority, application Austria, Dec. 4, 1986, 6597
Term of patent 14 years
U.S. Cl. D12—146

304,435
AUTOMOBILE TIRE
Yasuo Himuro, and Tetsuro Kobayashi, both of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan
Filed May 20, 1987, Ser. No. 52,348
Claims priority, application Japan, Nov. 21, 1986, 61-45849
Term of patent 14 years
U.S. Cl. D12—146

304,436
REMOVABLE VEHICLE TOP
Andrew A. Pike, Aguanga, Calif., assignor to Fleet Air, Gardena, Calif.
Filed Feb. 24, 1987, Ser. No. 18,065
Term of patent 14 years
U.S. Cl. D12—156

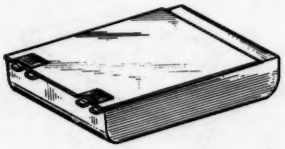


304,437
GRILLE CAP FOR A VEHICLE
David D. Eash, Columbia, Md., assignor to E&G Classics, Inc., Columbia, Md.
Filed Nov. 4, 1988, Ser. No. 267,007
Term of patent 14 years
U.S. Cl. D12—190



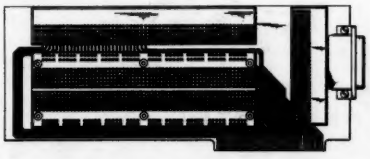
304,438
HELICOPTER WINDSHIELD UNIT
Herman H. Waldrup, Arlington, Tex., assignor to Heli Plex, Inc., Arlington, Tex.
Filed May 21, 1987, Ser. No. 52,570
Term of patent 14 years
U.S. Cl. D12—345

304,439
BATTERY PACK
Thomas Mitchell, Houston, and Drew D. Granzow, Spring, both of Tex., assignors to Compaq Computer Corporation, Houston, Tex.
Filed Oct. 14, 1988, Ser. No. 257,799
Term of patent 14 years
U.S. Cl. D13—8



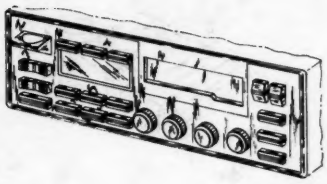
304,440
PROTECTIVE CASE FOR STORAGE BATTERY TERMINAL POST AND BATTERY CABLE END CONNECTED THERETO
Robert C. Drake, Cincinnati, Ohio, assignor to Dorman Products, Inc., Cincinnati, Ohio
Filed May 21, 1986, Ser. No. 865,611
Term of patent 14 years
U.S. Cl. D13—10

304,441
BREADBOARDING CARD FOR A PERSONAL COMPUTER
Keith Edmonds, Shelton, Conn., assignor to Interplex Electronics, Inc., New Haven, Conn.
Filed Jul. 8, 1986, Ser. No. 883,328
The portion of the term of this patent subsequent to Sep. 19, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D13—24



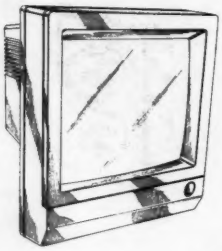
304,442
LIGHT CONTROL
Kenneth R. Fenne, Glen Ellyn, Ill., assignor to Pittway Corporation, Northbrook, Ill.
Filed Feb. 2, 1988, Ser. No. 151,264
Term of patent 14 years
U.S. Cl. D13—32

304,443
FRONT CONTROL PANEL FOR A VEHICULAR COMBINED TAPE PLAYER AND RADIO OR THE LIKE
Clive A. Grinyer, London, England, and Eugene P. Papak, Sterling Heights, Mich., assignors to Ford Motor Company, Dearborn, Mich.
Filed Apr. 17, 1986, Ser. No. 856,094
Term of patent 14 years
U.S. Cl. D14—258

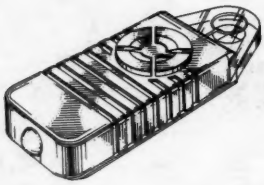


304,444
POINT OF SALE TERMINAL
Shiro Ikeya, Kawasaki, Japan, assignor to Nitsuko Limited, Kanagawa, Japan
Filed Sep. 5, 1986, Ser. No. 904,233
Claims priority, application Japan, Mar. 11, 1986, 61-8377
Term of patent 14 years
U.S. Cl. D14—105

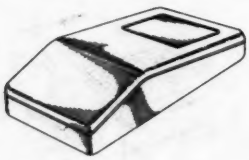
304,445
VIDEO DISPLAY
Lawrence M. Kuba, Nashua, N.H., assignor to Wang Laboratories, Inc., Lowell, Mass.
Filed Nov. 10, 1986, Ser. No. 929,136
Term of patent 14 years
U.S. Cl. D14—113



304,446
FOUR BUTTON CURSOR
Rick L. Hoover, Glendale, and James L. Rodgers, Mesa, both of Ariz., assignors to Kurta Corporation, Phoenix, Ariz.
Filed Nov. 10, 1986, Ser. No. 929,761
Term of patent 14 years
U.S. Cl. D14—114

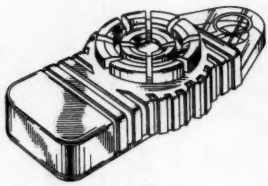


304,447
HOUSING FOR MOVABLE CURSOR CONTROL FOR A VIDEO DISPLAY
Steven Adams, San Jose; William Bull, Sunnyvale, and Stephen Peart, Los Gatos, all of Calif., assignors to Apple Computer Inc., Cupertino, Calif.
Filed Mar. 31, 1987, Ser. No. 33,482
Term of patent 14 years
U.S. Cl. D14—114



304,448
INTEGRATED CIRCUIT MEMORY MODULE
Michael De La Cruz, Saratoga, and Sigmar W. Willnauer, Portola Valley, both of Calif., assignors to Apple Computer Inc., Cupertino, Calif.
Filed Apr. 16, 1987, Ser. No. 39,529
Term of patent 14 years
U.S. Cl. D14—114

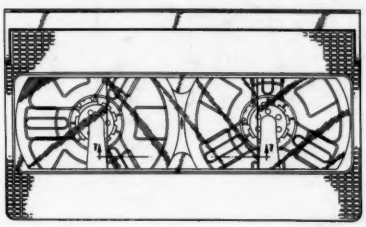
304,449
CURSOR
James L. Rodgers, Mesa, and Rick L. Hoover, Glendale, both of Ariz., assignors to Kurta Corporation, Phoenix, Ariz.
Filed Jun. 19, 1987, Ser. No. 65,002
Term of patent 14 years
U.S. Cl. D14—114



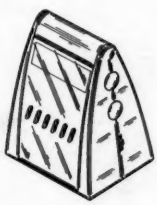
304,450
FACSIMILE TRANSCEIVER
Hideyuki Hosogai, and Junji Morihiro, both of Nagano, Japan, assignors to Matsushita Graphic Communication Systems, Inc., Tokyo, Japan
Filed Nov. 19, 1987, Ser. No. 123,072
Claims priority, application Japan, Jun. 19, 1987, 62-25148
Term of patent 14 years
U.S. Cl. D14—118

304,451
KEY BOARD FOR A COMPUTER
Katsuji Kagayama, Nara; Benito Mishiro, Osaka, and Yoshihiko Sugiyama, Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Sep. 5, 1986, Ser. No. 904,311
Claims priority, application Japan, Mar. 31, 1986, 61-11672
Term of patent 14 years
U.S. Cl. D14—115

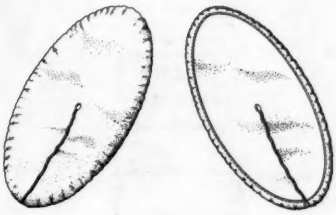
304,452
TAPE CASSETTE
Paul J. Gelardi, Cape Porpoise, and Robert B. MacLeod, Jr., Kennebunkport, both of Me., assignors to Shape Inc., Biddeford, Me.
Filed Aug. 14, 1986, Ser. No. 896,200
Term of patent 14 years
U.S. Cl. D14—121



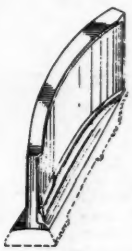
304,453
CLOCK RADIO
Takashi Matsushima, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Oct. 27, 1987, Ser. No. 114,136
Claims priority, application Japan, May 7, 1987, 62-18039
Term of patent 14 years
U.S. Cl. D14—170



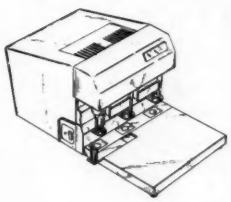
304,454
SATELLITE DISH COVER
John R. Serres, 1840 E. Lincoln Rd., Woodburn, Oreg. 97071
Filed Jul. 7, 1986, Ser. No. 882,766
Term of patent 14 years
U.S. Cl. D14—231



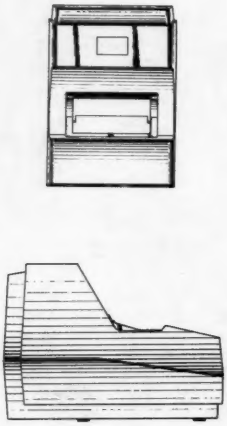
304,455
VANE FOR THROWING WHEEL
James H. Carpenter, Hagerstown, Md., assignor to Pangborn Corporation, Hagerstown, Md.
Filed Nov. 3, 1986, Ser. No. 926,241
Term of patent 14 years
U.S. Cl. D15—126



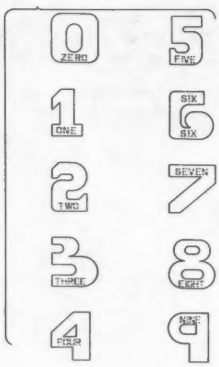
304,456
PAPER HOLE DRILL
Yoshihiro Takahashi, Tokyo, Japan, assignor to Plus Corporation, Japan
Filed Mar. 27, 1987, Ser. No. 30,902
Term of patent 14 years
U.S. Cl. D15—132



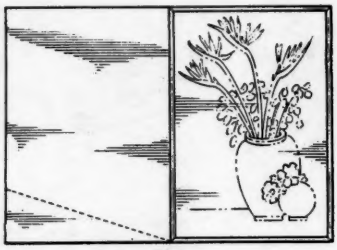
304,457
PRINTER FOR CASH REGISTER
Akira Tsukada, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Oct. 29, 1986, Ser. No. 924,508
Claims priority, application Japan, Apr. 30, 1986, 61-16795
Term of patent 14 years
U.S. Cl. D18—13

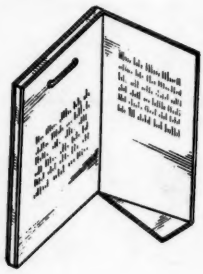


304,458
NUMERAL FONT
William H. Mowry, Jr., Ionia, N.Y., assignor to The Standard Register Co., Dayton, Ohio
Division of Ser. No. 794,986, Nov. 4, 1985. This application Aug. 22, 1986, Ser. No. 899,234
Term of patent 14 years
U.S. Cl. D18—24



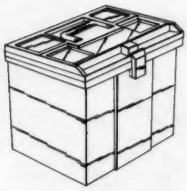
304,459
COMBINED PICTURE GREETING CARD AND DISPLAY MEANS
Gary F. Lambert, 834 Lincoln Blvd., Unit #3, Santa Monica, Calif. 90403
Filed Oct. 9, 1986, Ser. No. 917,379
Term of patent 14 years
U.S. Cl. D19—2



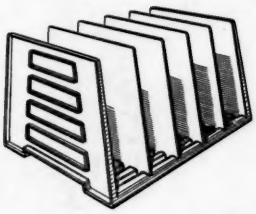


304,460
COMBINED DESK STAND
Siegfried Hölterscheidt, Hückelhoven, Fed. Rep. of Germany, assignor to Walter Henkels GmbH, Ratheim, Fed. Rep. of Germany
Filed Apr. 10, 1986, Ser. No. 851,402
Claims priority, application Fed. Rep. of Germany, Jan. 6, 1986, MR168
Term of patent 14 years
U.S. Cl. D19—77

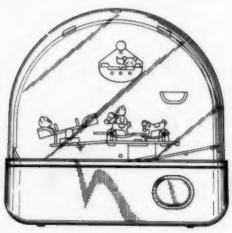
304,461
COMPARTMENTED FILE BOX
Kenneth C. Foran, Wooster, and Thomas J. David, Worthington, both of Ohio, assignors to Rubbermaid Incorporated, Wooster, Ohio
Filed Aug. 7, 1986, Ser. No. 894,171
Term of patent 14 years
U.S. Cl. D19—86



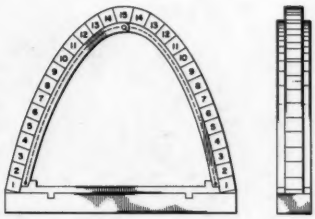
304,462
VERTICAL FILE SORTER
Dale M. Evans, Windsor, Wis., assignor to EVCO Office Products, DeForest, Wis.
Filed Dec. 11, 1986, Ser. No. 941,947
Term of patent 14 years
U.S. Cl. D19—90



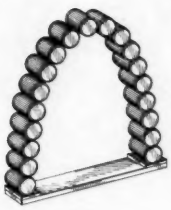
304,463
WATER GAME HOUSING
Makiko Watanabe, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Mar. 11, 1987, Ser. No. 24,405
Claims priority, application Japan, Sep. 13, 1986, 61-36244
Term of patent 14 years
U.S. Cl. D21—12



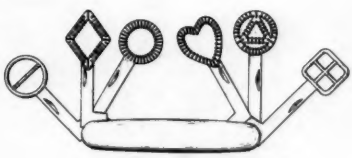
304,464
CATENARY ARCH BUILDING TOY
Donald L. Andrews, 5802 Sanibel Captiva Rd., Sanibel, Fla. 33957
Filed Jul. 10, 1987, Ser. No. 71,721
Term of patent 14 years
U.S. Cl. D21—59



304,465
CATENARY ARCH BARREL BUILDING TOY
Donald L. Andrews, 5802 Sanibel Captiva Rd., Sanibel, Fla. 33957
Filed Mar. 18, 1988, Ser. No. 169,764
Term of patent 14 years
U.S. Cl. D21—59

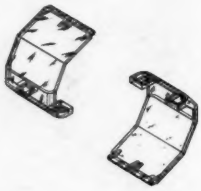


304,466
MULTIRING BUBBLE TOY
Michael P. Glickman, Chicago, Ill., assignor to Strombecker Corporation, Chicago, Ill.
Filed Dec. 28, 1987, Ser. No. 138,677
Term of patent 14 years
U.S. Cl. D21—61

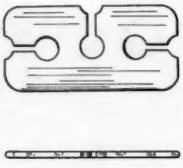


304,467
ENGINE FOR A TOY AIRCRAFT
Erik P. Tapdrup, Virum, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Dec. 2, 1987, Ser. No. 128,483
Term of patent 14 years
U.S. Cl. D21—91

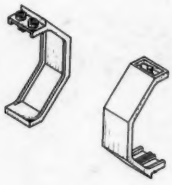
304,468
COCKPIT ELEMENT FOR A TOY AIRCRAFT
Erling T. Dideriksen, Billund, Denmark, assignor to Interlego A.G., Switzerland
Filed Dec. 2, 1987, Ser. No. 128,488
Term of patent 14 years
U.S. Cl. D21—91



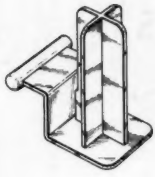
304,469
TOY CONSTRUCTION PIECE
János Kövesdi, Budapest, Hungary, assignor to Konsumex Kulkerskedelmi Vallalat, Hungary
Filed Jan. 23, 1987, Ser. No. 6,648
Term of patent 14 years
U.S. Cl. D21—108



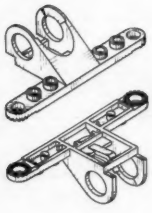
304,470
TOY CURVED WALL ELEMENT
Jens N. Knudsen, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Dec. 2, 1987, Ser. No. 128,484
Term of patent 14 years
U.S. Cl. D21—108



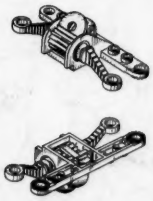
304,471
CONNECTOR ELEMENT FOR A CONSTRUCTION TOY
Vic Bertrand, Dollard des Ormeaux, Canada, assignor to The Ritvik Group Inc., Dorval, Canada
Filed Sep. 21, 1987, Ser. No. 99,209
Claims priority, application Canada, May 6, 1987, 06-05-87-11
Term of patent 14 years
U.S. Cl. D21—141



304,472
HOUSING FOR A TOY STEERING GEAR ROD
Ole V. Poulsen, Vejle, Denmark, assignor to Interlego A.G., Switzerland
Filed Dec. 2, 1987, Ser. No. 127,873
Term of patent 14 years
U.S. Cl. D21—141



304,473
STEERING GEAR FOR A TOY VEHICLE
Ole V. Poulsen, Vejle, Denmark, assignor to Interlego A.G., Switzerland
Filed Dec. 2, 1987, Ser. No. 128,528
Term of patent 14 years
U.S. Cl. D21—141



304,474
TOY ANIMAL
Henry Neville, Lane Cove, Australia, assignor to Down Under Orphans Pty. Ltd., New South Wales, Australia
Filed Aug. 18, 1986, Ser. No. 897,770
Claims priority, application Australia, Feb. 19, 1986, 4241/86
Term of patent 14 years
U.S. Cl. D21—148

304,475
STUFFED TOY FIGURE
Gwendolyn A. Fiust, 526 Hellwig La., West Islip, N.Y. 11795
Filed Dec. 19, 1986, Ser. No. 943,596
Term of patent 14 years
U.S. Cl. D21—160

304,476
STUFFED TOY FIGURE
Gwendolyn A. Fiust, 526 Hellwig La., West Islip, N.Y. 11795
Filed Dec. 19, 1986, Ser. No. 943,592
Term of patent 14 years
U.S. Cl. D21—161

304,477
STUFFED TOY FIGURE
Gwendolyn A. Fiust, 526 Hellwig La., West Islip, N.Y. 11795
Filed Dec. 19, 1986, Ser. No. 943,591
Term of patent 14 years
U.S. Cl. D21—171

304,478
STUFFED TOY FIGURE
Gwendolyn A. Fiust, 526 Hellwig La., West Islip, N.Y. 11795
Filed Dec. 19, 1986, Ser. No. 943,597
Term of patent 14 years
U.S. Cl. D21—171

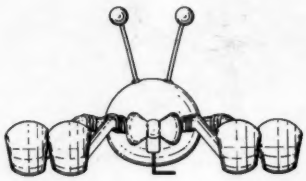
304,479
STUFFED TOY FIGURE
Gwendolyn A. Fiust, 526 Hellwig La., West Islip, N.Y. 11795
Filed Dec. 19, 1986, Ser. No. 943,600
Term of patent 14 years
U.S. Cl. D21—171

304,480
STUFFED TOY FIGURE
Gwendolyn A. Fiust, 526 Hellwig La., West Islip, N.Y.
Filed Dec. 19, 1986, Ser. No. 943,921
Term of patent 14 years
U.S. Cl. D21—171

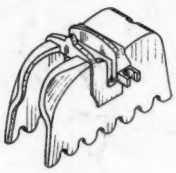
304,481
STUFFED TOY FIGURE
Gwendolyn A. Fiust, 526 Hellwig La., West Islip, N.Y. 11795
Filed Dec. 19, 1986, Ser. No. 943,589
Term of patent 14 years
U.S. Cl. D21—177

304,482
STUFFED TOY FIGURE
Gwendolyn A. Fiust, 526 Hellwig La., West Islip, N.Y. 11795
Filed Dec. 19, 1986, Ser. No. 943,595
Term of patent 14 years
U.S. Cl. D21—177

304,483
PULL TOY
Harry S. Thomson, Richmond; David M. Raffo, and John A. Pape, both of Hitchin, all of England, assignors to Hestair Kiddicraft Limited, Bristol, England
Filed Apr. 22, 1986, Ser. No. 857,447
Claims priority, application United Kingdom, Nov. 4, 1985, 1030228
Term of patent 14 years
U.S. Cl. D21—105



304,484
TOY CAPARISON
Jens N. Knudsen, Billund, Denmark, assignor to Interlego A.G., Switzerland
Filed Dec. 2, 1987, Ser. No. 127,887
Term of patent 14 years
U.S. Cl. D21—189



304,485

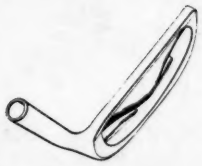
GOLF IRON HEAD

D. Clayton Long, Albany, Ga., assignor to MacGregor Golf Company, Albany, Ga.

Filed Jun. 24, 1987, Ser. No. 66,098

Term of patent 14 years

U.S. Cl. D21—220



304,486

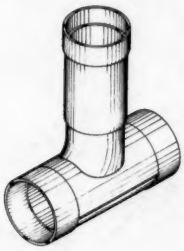
HOUSING FOR A SHUT-OFF VALVE

Paul S. Elder, Meeker, Colo., and Harold E. Damratowski, Alda, Nebr., assignors to Elder Valve, Inc., Meeker, Colo.

Filed Feb. 24, 1986, Ser. No. 836,564

Term of patent 14 years

U.S. Cl. D23—233



304,487

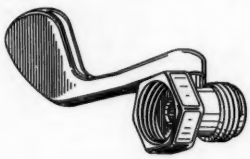
FLOW CONTROL VALVE AND NOZZLE

Robert W. Hengesbach, 7886 Mentor Rd., Mentor, Ohio 44060

Continuation of Ser. No. 860,758, May 5, 1986, which is a continuation-in-part of Ser. No. 461,872, Jan. 28, 1983, and Ser. No. 461,873, Jan. 28, 1983. This application Jul. 26, 1988, Ser. No. 224,252

Term of patent 14 years

U.S. Cl. D23—245



304,488

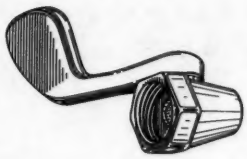
COMBINED FLOW CONTROL VALVE AND NOZZLE

Robert W. Hengesbach, 7886 Mentor Rd., Mentor, Ohio 44060

Continuation of Ser. No. 860,759, May 5, 1986, which is a continuation-in-part of Ser. No. 461,872, Jan. 28, 1983, and Ser. No. 461,873, Jan. 28, 1983. This application Jul. 26, 1988, Ser. No. 224,253

Term of patent 14 years

U.S. Cl. D23—245



304,489

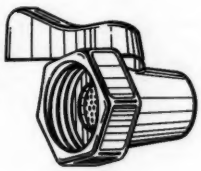
COMBINED FLOW CONTROL VALVE AND NOZZLE

Robert W. Hengesbach, 7886 Munson Rd., Mentor, Ohio 44060

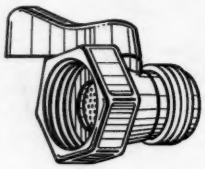
Continuation-in-part of Ser. No. 224,252, Jul. 26, 1988, and Ser. No. 224,253, Jul. 26, 1988, each is a continuation of Ser. No. 860,758, May 5, 1986, abandoned, and Ser. No. 860,759, May 5, 1986, abandoned, each is a continuation-in-part of Ser. No. 461,872, Jan. 28, 1983, Pat. No. D. 285,478, and Ser. No. 461,873, Jan. 28, 1983, Pat. No. D. 285,479. This application Oct. 7, 1988, Ser. No. 255,525

Term of patent 14 years

U.S. Cl. D23—245

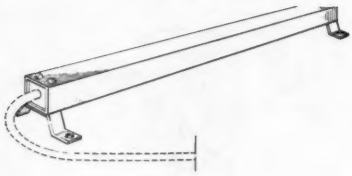


304,490
FLOW CONTROL VALVE
Robert W. Hengesbach, 7886 Munson Rd., Mentor, Ohio 44060
Continuation-in-part of Ser. No. 224,252, Jul. 26, 1988, and Ser. No. 224,253, Jul. 26, 1988, each is a continuation of Ser. No. 860,758, May 5, 1986, abandoned, and Ser. No. 860,759, May 5, 1986, abandoned, each is a continuation-in-part of Ser. No. 461,872, Jan. 28, 1983, Pat. No. D. 285,478, and Ser. No. 461,873, Jan. 28, 1983, Pat. No. D. 285,479. This application Oct. 7, 1988, Ser. No. 255,527
Term of patent 14 years
U.S. Cl. D23—245

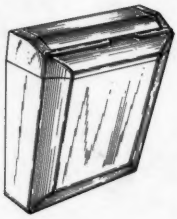


304,491
SPOUT
Herbert Reinecke, Iserlohn, Fed. Rep. of Germany, assignor to Aloys F. Dornbracht GmbH & Co., Iserlohn, Fed. Rep. of Germany
Filed Sep. 8, 1986, Ser. No. 905,235
Claims priority, application Fed. Rep. of Germany, Mar. 13, 1986, MR-7474; Aug. 25, 1986, MR-7498
Term of patent 14 years
U.S. Cl. D23—255

304,492
ELECTRIC HEATING ELEMENT
Terri Tiitinen, Pellavakuja 7, SF-04400 Järvenpää , Finland
Filed Sep. 11, 1986, Ser. No. 906,781
Term of patent 14 years
U.S. Cl. D23—386

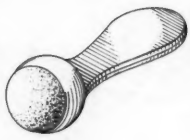


304,493
CONTAINER FOR DISPOSING OF HYPODERMIC NEEDLES AND OTHER SHARP MEDICAL ITEMS
Richard A. Bemis, Sheboygan, Wis., assignor to Bemis Manufacturing Company, Sheboygan Falls, Wis.
Filed Jun. 1, 1987, Ser. No. 56,791
Term of patent 14 years
U.S. Cl. D24—8

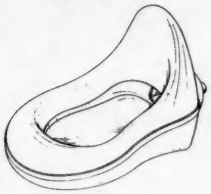


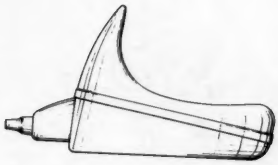
304,494
LARYNGOSCOPE
Frederic P. Rosenwald, Churchville, and Andrew J. Furey, Philadelphia, both of Pa., assignors to Pilling Company, Fort Washington, Pa.
Filed Jun. 11, 1987, Ser. No. 62,045
Term of patent 14 years
U.S. Cl. D24—18

304,495
SCAR MASSAGING ROLLER
James Tyo, and Diane Tyo, both of 633 E. Walnut, Green Bay, Wis. 54301
Filed Feb. 6, 1987, Ser. No. 11,849
Term of patent 14 years
U.S. Cl. D24—36

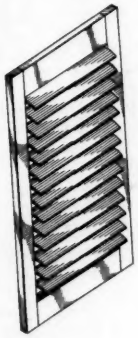


304,496
FEMALE URINAL
Madeline Thomas, Godalming, England, assignor to H. G. Wallace Limited, Colchester, England
Filed Jun. 26, 1987, Ser. No. 66,712
Term of patent 14 years
U.S. Cl. D24—54





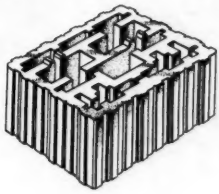
304,497
WINDOW SHUTTER
Kenneth W. Briggs, Sr., Rice, Tex., assignor to Rushman Draperies, Inc., Dallas, Tex.
Filed Jun. 4, 1987, Ser. No. 57,854
Term of patent 14 years
U.S. Cl. D25—47



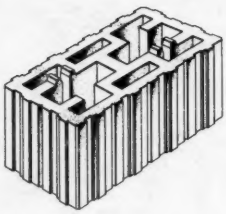
304,498
SUBCEILING PANEL UNIT
Bruce P. Carey, Saugus, Calif., assignor to USG Interiors, Inc., Chicago, Ill.
Filed Sep. 30, 1986, Ser. No. 913,863
Term of patent 14 years
U.S. Cl. D25—58

304,499
FOLDING STAIR UNIT
Orley D. Rogers, Farwell, and Kenneth E. Staten, Clare, both of Mich., assignors to Stageright Corporation, Clare, Mich.
Filed May 12, 1988, Ser. No. 194,572
Term of patent 14 years
U.S. Cl. D25—62

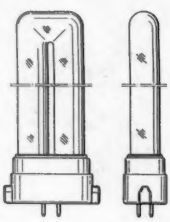
304,500
SIX CAVITY BUILDING BLOCK
Emerson J. VanWassehnova, and Percy K. Sagar, both of Shawnee, Kans., assignors to Lithibar Matik, Inc., Holland, Mich.
Filed Feb. 17, 1987, Ser. No. 15,867
Term of patent 14 years
U.S. Cl. D25—114



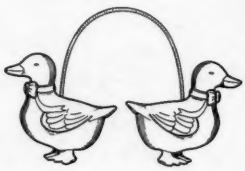
304,501
FOUR CAVITY BUILDING BLOCK
Emerson J. VanWassehnova, and Percy K. Sagar, both of Shawnee, Kans., assignors to Lithibar Matik, Inc., Holland, Mich.
Filed Feb. 17, 1987, Ser. No. 15,868
Term of patent 14 years
U.S. Cl. D25—114



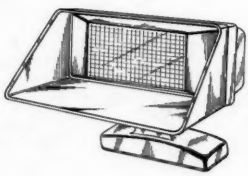
304,502
COMPACT FLUORESCENT LAMP
Albert Heidemann, Munich, and Michael Kappler, Friedberg, both of Fed. Rep. of Germany, assignors to Osram GmbH, Munich, Fed. Rep. of Germany
Filed Feb. 9, 1987, Ser. No. 12,301
Claims priority, application Fed. Rep. of Germany, Aug. 20, 1986, DM/007379
Term of patent 14 years
U.S. Cl. D26—3



304,503
PAIR OF LINKED CANDLES
Michael C. B. Lam, Ground Floor, Kwai Bo Industrial Building, 40 Wong Chuk Hang Road, Aberdeen, Hong Kong
Filed Aug. 28, 1986, Ser. No. 901,473
The portion of the term of this patent subsequent to Oct. 31, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D26—7



304,504
AUXILIARY AUTOMOTIVE VEHICLE BRAKE LIGHT
Cheng Pin Chen, 26, Alley 14, Lane 64, Chung Shan Rd., Sec. 2, Chung Ho, Taiwan
Filed May 28, 1986, Ser. No. 867,747
Term of patent 14 years
U.S. Cl. D26—28

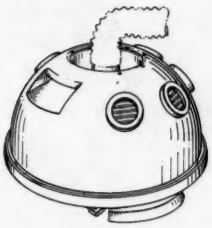


304,505

UNDERWATER POOL CLEANING APPARATUS

Robert W. Maier, Kentfield; Charles J. Patterson, Orinda; Deiter Rief, Rohnert Park; John Gard, Mountain View, and Herman E. Frentzel, Kentfield, all of Calif., assignors to Aquanaut, Inc., Corte Madera, Calif.

Filed Oct. 2, 1986, Ser. No. 914,749
Term of patent 14 years
U.S. Cl. D32—1

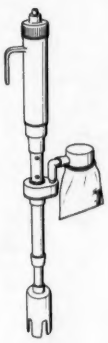


304,506

AQUARIUM CLEANER

Kazutoshi Tominaga, Higashi Osakashi, Japan, assignor to Kabushiki Kaisha Tominaga Jyushi Kogyosho, Higashi Osakashi, Japan

Filed Sep. 11, 1986, Ser. No. 906,190
Claims priority, application Japan, Apr. 28, 1986, 61-16108
Term of patent 14 years
U.S. Cl. D30—106

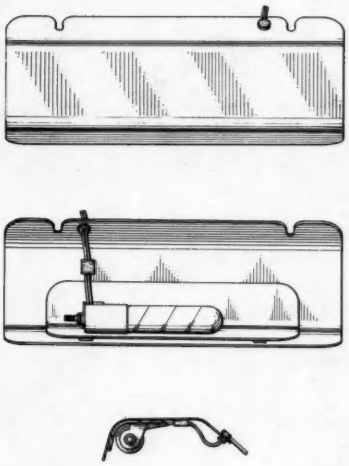


304,507

ELECTRIC LIGHTING FIXTURE PRIMARILY INTENDED FOR USE WITH LECTERNS

Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.

Filed Mar. 27, 1987, Ser. No. 30,544
Term of patent 14 years
U.S. Cl. D26—76

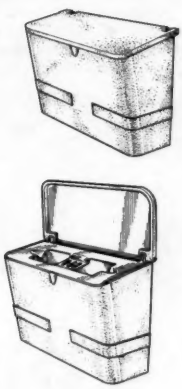


304,508

ASHTRAY FOR AUTOMOBILE DOORS

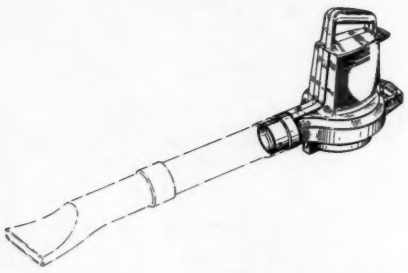
Pierre Charet, and Duke Kraai, both of Miami, Fla., assignors to Rally Manufacturing, Inc., Miami, Fla.

Filed Dec. 5, 1986, Ser. No. 938,752
Term of patent 14 years
U.S. Cl. D27—105

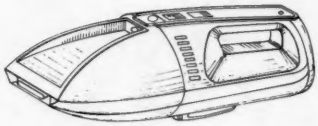


304,509
COSMETIC CAP OR SIMILAR ARTICLE
Karena Bakic, Varese, Italy, assignor to Cosmede Anstalt, Vaduz, Liechtenstein
Filed Apr. 6, 1987, Ser. No. 34,565
Claims priority, application Fed. Rep. of Germany, Oct. 31, 1986, URA 1410/86
Term of patent 14 years
U.S. Cl. D28—84

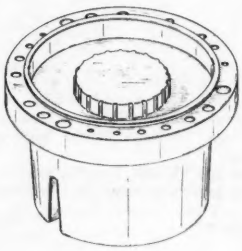
304,510
COMBINED BLOWER AND VACUUM UNIT
Michael Baker, Gloster, La.; Jerry E. Stuart, Lake Havasu, Ariz., and William H. Schultz, Northbend, Ill., assignors to White Consolidated Industries, Inc., Cleveland, Ohio
Filed Jul. 6, 1987, Ser. No. 69,622
Term of patent 14 years
U.S. Cl. D32—15

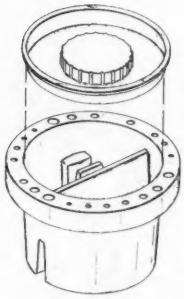


304,511
RECHARGEABLE VACUUM CLEANER
John S. Yuen, Kowloon, Hong Kong, assignor to John Manufacturing Limited, Kowloon, Hong Kong
Filed Mar. 27, 1987, Ser. No. 31,831
Claims priority, application United Kingdom, Sep. 29, 1986, 1037013
Term of patent 14 years
U.S. Cl. D32—18



304,512
COMBINED ARTIST'S BRUSH HOLDER AND CLEANING VESSEL
Carroll C. Byers, Chamblee, Ga., and Sheldon Schmidt, Paramus, N.J., assignors to Loew-Cornell, Inc., Teaneck, N.J.
Filed Dec. 9, 1987, Ser. No. 130,674
Term of patent 14 years
U.S. Cl. D32—35



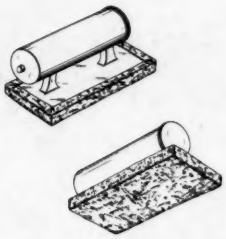


304,513

DUSTING AND WAXING DEVICE

Carmen V. Loffredo, 29291 Rhona Dr., Laguna Niguel, Calif. 92656

Filed May 6, 1987, Ser. No. 47,702
Term of patent 14 years
U.S. Cl. D32—40



304,514

COMMUNION CUP

Edward Vezirian, 110 Firwood, Irvine, Calif. 92714, and Earle L. Hinton, 851 Brighton, La Habra, Calif. 90631

Filed Aug. 25, 1986, Ser. No. 900,004
Term of patent 14 years
U.S. Cl. D99—25

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 7TH DAY OF NOVEMBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A and A Realty Company: *See*—
Kaye, John A., 4,878,922, Cl. 44-502.000.

A & L Laboratories, Inc.: *See*—
Pochard, Guy; and Steiner, Creighton, 4,878,951, Cl. 134-22.170.

A. O. Smith Corporation: *See*—
Pfeffer, John D., 4,878,482, Cl. 126-375.000.

A.P.T. Anlagen fur Pyrotechnik GmbH: *See*—
Verheyden, G. M. C., Jr., 4,878,838, Cl. 432-8.000.

A. Stephen u. Soehne GmbH & Co.: *See*—
Otto, Friedrich, 4,878,627, Cl. 241-199.120.

A. W. Schlottmann: *See*—
Sanders, John T., 4,879,027, Cl. 210-123.000.

Abe, Michio: *See*—
Moriguchi, Soyao; Suzuki, Hiroshi; Watanabe, Hiroko; Satoh, Motoaki; Abe, Michio; and Iwata, Yasuo, 4,879,340, Cl. 525-54.200.

Abe, Ryoichi: *See*—
Kurokawa, Naohiro; and Abe, Ryoichi, 4,879,678, Cl. 364-900.000.

Abe, Yoshinori: *See*—
Niki, Hiroshi; Matsunawa, Masahiko; Yamamoto, Hiroyuki; and Abe, Yoshinori, 4,879,595, Cl. 358-80.000.

Abel, James C., to Atlantic Richfield Company. Viscometer apparatus and method. 4,878,377, Cl. 73-59.000.

Abrams, Richard; and Swartz, Conrad M., to Somatics, Inc. Electroconvulsive therapy apparatus and method for automatic monitoring of patient seizures. 4,878,498, Cl. 128-419.00S.

Achiwa, Kazuo. Chiral phosphinopyrrolidine compounds and their use for asymmetric synthesis of optically active compounds. 4,879,389, Cl. 548-412.000.

Acocella, John: *See*—
Herron, Lester W.; Lussow, Robert O.; Nufer, Robert W.; Schwartz, Bernard; Acocella, John; and Reddy, Srinivasa N., 4,879,156, Cl. 428-137.000.

Adachi, Keiichi: *See*—
Ishigaki, Kunio; Takahashi, Toshiro; Mihara, Yuji; Adachi, Keiichi; Ohno, Shigeru; Okada, Masahiro; and Saeki, Naomi, 4,879,204, Cl. 430-512.000.

Adair, Edwin L. Rigid video endoscope with heat sterilizable sheath. 4,878,485, Cl. 128-6.000.

Adam, Colin M.; Bye, Richard L.; Das, Santosh K.; and Skinner, David J., to Allied-Signal Inc. Rapidly solidified aluminum based, silicon containing alloys for elevated temperature applications. 4,878,967, Cl. 148-437.000.

Adam, Colin M.; Bye, Richard L.; Das, Santosh K.; and Skinner, David J., to Allied-Signal Inc. Rapidly solidified aluminum based silicon containing, alloys for elevated temperature applications. 4,879,095, Cl. 420-548.000.

Adamantech, Inc.: *See*—
Moore, Robert E., 4,879,062, Cl. 252-315.100.

Adamek, Jan; Schaich, Karl-Heinz; and Heck, Wolfgang, to Dr. Ing. h.c.f. Porsche Aktiengesellschaft. Method and manual apparatus for the semimechanical galvanizing of sheet metal surfaces. 4,879,015, Cl. 204-224.00R.

Adams, Steven P.: *See*—
Tjoeng, Foe S.; and Adams, Steven P., 4,879,313, Cl. 514-616.000.

Adamski, Maximilian; Kosrow, Robert L.; and Ruderman, Stephen, to Union Special Corporation. Hemmer seamer assembly. 4,878,445, Cl. 112-311.000.

Adamson, Lee F., to Specialty Equipment Companies, Inc. Cooking apparatus. 4,878,424, Cl. 99-349.000.

Adkins, Kelvin P., to Imperial Chemical Industries Plc. Electroconductive coating composition. 4,879,064, Cl. 252-500.000.

Advanced Micro Devices, Inc.: *See*—
Gershon, Eugen, 4,879,478, Cl. 307-353.000.
Ramesh, Nallepilli S.; Cheemalavagu, Suresh; and Erikson, Anders, 4,879,727, Cl. 375-76.000.

Advanced Nuclear Fuels Corporation: *See*—
van Swam, Leo F.; Blair, Thomas R.; and Ho, Quang D., 4,879,088, Cl. 376-252.000.

Advanced Products & Technologies: *See*—
Rondel, Stephen A.; and Dobson, James B., 4,878,701, Cl. 292-288.000.

Aebischer, Patrick; Valentini, Robert F.; and Galletti, Pierre M., to Pfizer Hospital Products Group, Inc. Devices for neural signal transmission. 4,878,913, Cl. 623-12.000.

Aerion Industries, Inc.: *See*—
Brunton, James L., 4,879,115, Cl. 424-694.000.

AGFA-Gevaert N.V.: *See*—
Tavernier, Serge M.; Van Beek, Joannes J.; and van Daele, Pierre L., 4,879,198, Cl. 430-106.600.
Van Biesen, Jozef A.; Daes, Guido F.; and Verstringe, Jan B., 4,879,196, Cl. 430-100.000.
Vermeersch, Joan T.; Timmerman, Daniel; Vandenabeele, Hubert; and Vervecken, Jacques L., 4,879,209, Cl. 430-623.000.

Agri-Diagnostics Associates: *See*—
Petersen, Frank P.; Grothaus, Gary D.; and Miller, Sally A., 4,879,217, Cl. 435-7.000.

Aguilar, Alberto B. Safety indicator device for low water crossing. 4,879,545, Cl. 340-624.000.

Ahern, Glenn J.: *See*—
Malka, Jacob H.; and Ahern, Glenn J., 4,879,642, Cl. 364-131.000.

Ahlstromforetagen Svenska AB: *See*—
Ryham, Rolf, 4,878,441, Cl. 110-238.000.

Aida, Mitsuo: *See*—
Sometani, Taro; Takaoka, Naotoshi; Aida, Mitsuo; Kudomi, Mitsuharu; Tanahashi, Yasuhiro; and Aoki, Katsunori, 4,879,509, Cl. 324-108.000.

Aikawa, Toyoshi; and Sekine, Eiichi, to Ichikoh Industries Limited. Automotive mirror using electrochromic element. 4,878,743, Cl. 350-357.000.

Air Products and Chemicals, Inc.: *See*—
Ness, Leif A., 4,878,350, Cl. 62-50.100.
Shah, Virendra V., 4,878,948, Cl. 106-90.000.

Aisin-Aw Kabushiki Kaisha: *See*—
Sakakibara, Shiro; Miyaishi, Yoshinori; and Kano, Yoshiaki, 4,878,887, Cl. 474-245.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Kimura, Junzo; and Nakao, Toshiyuki, 4,878,400, Cl. 74-715.000.
Kondo, Toshio, 4,878,564, Cl. 188-73.310.
Teranishi, Shunichi; and Hayashi, Takeshi, 4,879,615, Cl. 369-34.000.
Toda, Hiroshi, 4,878,715, Cl. 303-110.000.

Akagawa, Yoshifumi: *See*—
Tsumiyama, Tatsuo; Shimada, Toshiro; Akagawa, Yoshifumi; Nakamoto, Satoru; and Takada, Teruo, 4,879,341, Cl. 525-66.000.

Akatsuka, Yuichiro, to Olympus Optical Co., Ltd. Medical picture filing system. 4,879,665, Cl. 364-518.000.

Akerlund, Gorgen: *See*—
Hook, Jan-Erik; and Akerlund, Gorgen, 4,878,998, Cl. 162-49.000.

Akerman, Paul; and Meyer, Wolfram, to Bieri Pumpenbau AG. Circulating pump. 4,878,804, Cl. 415-111.000.

Akiyama, Takao; Ito, Tetsuo; and Sumida, Isao, to Hitachi, Ltd. Nuclear power plant. 4,879,087, Cl. 376-216.000.

Akzo America Inc.: *See*—
Mullin, Geralyn, 4,879,052, Cl. 252-32.500.

AKZO BM Arnhem, The Netherlands: *See*—
Weidenhaupt, Wolfgang; Wepner, Gunther; Dismon, Peter; and Remijn, Mattheus G., 4,878,343, Cl. 57-222.000.

Alam, Abu S.; Koziol, Kenneth J.; and Kapoor, John N., to Lyphomed, Inc. Cyclophosphamide. 4,879,286, Cl. 514-110.000.

Alam, Abu S.; Joshi, Utpal G.; Mehta, Jairaj U.; Sayeed, Fakrul A. A.; and Kapoor, John N., to LyphoMed, Inc. Aqueous nitroglycerin injection and manufacturing process. 4,879,308, Cl. 514-509.000.

Alb. Klein GmbH & Co. KG: *See*—
Bastgen, Wendel, 4,879,034, Cl. 210-400.000.

Albrecht, Bernhard; and Beyrich, Jurgen, to Ciba-Geigy Corporation. Process for the preparation of chloronitroanilines and chloronitrophenols. 4,879,415, Cl. 564-412.000.

Alderman, Edward M.; Fett, James W.; and Vallee, Bert L., to President and Fellows of Harvard College. Method of isolating tumor-secreted products using a novel protein-free medium. 4,879,222, Cl. 435-68.000.

Aldred, Edward J.; and Lloyd, David J., to Ransomes, Sims & Jefferies PLC. Grass cutting machine. 4,878,338, Cl. 56-7.000.

Alexandratos, Spiro D.; Danesi, Pier R.; and Horwitz, E. Philip, to University of Tennessee Research Corporation, The. Interpenetrating polymer network ion exchange membranes and method for preparing same. 4,879,316, Cl. 521-27.000.

Alheritiere, Edouard; and Prandi, Bernard, to Compagnie Europeenne du Zirconium Cezus. Wrought and heat treated titanium alloy part. 4,878,966, Cl. 148-421.000.

Alitec Corporation: *See*—
Zanetis, C. Christopher, 4,878,713, Cl. 299-39.000.

Allegheny Ludlum Corporation: *See*—
Stroble, Carl P.; and More, Anthony P., 4,878,959, Cl. 148-111.000.

Allied Resin Corporation: *See*—
Zemlin, John C., 4,879,032, Cl. 210-321.610.

Allied-Signal Inc.: *See*—
Adam, Colin M.; Bye, Richard L.; Das, Santosh K.; and Skinner, David J., 4,878,967, Cl. 148-437.000.
Adam, Colin M.; Bye, Richard L.; Das, Santosh K.; and Skinner, David J., 4,879,095, Cl. 420-548.000.
Cordova, David S.; Rowan, Hugh H.; and Young, John A., 4,879,179, Cl. 428-361.000.

Daly, Paul D.; Brooks, Mark A.; Fallis, Robert E.; and Cerny, Mark S., 4,878,650, Cl. 251-129.150.
Malka, Jacob H.; and Ahern, Glenn J., 4,879,642, Cl. 364-131.000.
Maxfield, MacRae; Baughman, Ray H.; Igbal, Zafar; and Eckhardt, Helmut, 4,879,270, Cl. 505-1.000.
Vick, Ralph L., 4,878,419, Cl. 92-163.000.

Alps Electric Co., Ltd.: *See*—
Yamashita, Akihiko, 4,879,620, Cl. 360-123.000.

AM International, Inc.: *See*—
Bartky, W. Scott; Paton, Anthony D.; Temple, Stephen; and Michaelis, A. John, 4,879,568, Cl. 346-140.00R.

Amca International Corporation: *See*—
Regan, James B.; Ikovich, George J.; Carlsen, James A.; Juelich, Richard J.; and Kogel, Henry G., 4,878,452, Cl. 114-293.000.

Amek Systems & Controls Limited: *See*—
Franks, Nicholas; and Langley, Graham A., 4,879,751, Cl. 381-119.000.

American Air Liquide: *See*—
Kasper, Gerhard; Wen, Horng-Yuan; and Nishikawa, Yukinobu, 4,878,510, Cl. 137-1.000.

American Cyanamid Company: *See*—
Singh, Balwant; Chang, Laurence W.; and Henderson, William A., Jr., 4,879,410, Cl. 560-344.000.

American Medical Systems, Inc.: *See*—
Polyak, Mark, 4,878,889, Cl. 600-31.000.

American National Can Company: *See*—
Webster, Charles; and John, Christian J., 4,878,589, Cl. 215-252.000.

American Telephone and Telegraph Company, AT&T Bell laboratories: *See*—
Wood, Thomas H., 4,879,763, Cl. 455-607.000.

American Telephone and Telegraph Company: *See*—
Burke, Edmund T.; Dawdy, Daniel H.; and Rubert, Timothy M., 4,879,743, Cl. 379-142.000.
Fatehi, Mohammad T., 4,878,726, Cl. 350-96.150.
Muhlberger, Michael A.; and Rapp, Willard E., 4,878,295, Cl. 29-863.000.
Picone, Joseph; and Prezas, Dimitrios, 4,879,748, Cl. 381-49.000.
Smith, Douglas C., 4,879,507, Cl. 324-57.00N.

American Telephone and Telegraph Company, AT&T Bell Laboratories: *See*—
LoVasco, Francis; and Oien, Michael A., 4,878,611, Cl. 228-180.200.
Tarallo, Joseph A., 4,879,728, Cl. 375-80.000.

American Telephone and Telegraph Company, AT&T Bell Labs: *See*—
Myer, Robert E., 4,879,519, Cl. 330-149.000.

American Type Culture Collection: *See*—
Daggett, Pierre-Marc; and Simione, Frank P., 4,879,239, Cl. 435-252.100.

American Wholesale Packaging, Inc.: *See*—
Quinn, Daniel M., 4,878,334, Cl. 53-399.000.

Ames, John E., to Sundstrand Corporation. Power source and control mechanism for propeller pitch control. 4,878,809, Cl. 416-151.000.

Amiet, Louis, to Rhone-Poulenc Chimie. Process for the preparation of ethyl trifluoroacetate. 4,879,407, Cl. 560-227.000.

Ammeraal, Thomas C. M. Conveying apparatus for loading and unloading goods, in particular for use with ships. 4,878,796, Cl. 414-141.700.

Amoco Corporation: *See*—
Dixon, George J.; Anthon, Douglas W.; and Clark, John H., 4,879,722, Cl. 372-21.000.
Dixon, George J.; Anthon, Douglas W.; and Clark, John H., 4,879,723, Cl. 372-21.000.
Harris, James E.; Matzner, Markus; and Robeson, Lloyd M., 4,879,354, Cl. 525-425.000.
Schubert, John C.; and Leduc, Edward C., 4,878,970, Cl. 156-69.000.
Waynick, John A., 4,879,054, Cl. 252-41.000.

Amos, Michael D.: *See*—
Kovarik, David P.; and Amos, Michael D., 4,879,452, Cl. 219-130.400.

AMP Incorporated: *See*—
Caron, Bernard G.; Gutterman, Pamela R.; and Murray, Dale D., 4,878,731, Cl. 350-96.210.
Swengel Jr., Robert C.; and Wise, James H., 4,878,863, Cl. 439-884.000.
Wise, James H., 4,878,862, Cl. 439-787.000.

Ampex Corporation: *See*—
Brush, Richard K., 4,879,731, Cl. 375-116.000.

Amphenol Corporation: *See*—
Talwar, Anil K.; and Warywoda, Joseph, 4,878,849, Cl. 439-79.000.

An-Tech International Livestock Products: *See*—
Howe, Steve R., 4,878,456, Cl. 119-156.000.

Analog Devices, Inc.: *See*—
Barrow, Jeffrey G.; and Brokaw, Adrian P., 4,879,505, Cl. 323-312.000.
Ruggierio, Paul A.; and Anderson, Cynthia E., 4,878,770, Cl. 388-308.000.

Anami, Kenji; Ichinose, Katsuki; and Wada, Tomohisa, to Mitsubishi Denki Kabushiki Kaisha. Static random access memory with reduced soft error rate. 4,879,690, Cl. 365-201.000.

Anapliotis, Emmanuel: *See*—
Kranz, Curt; and Anapliotis, Emmanuel, 4,878,917, Cl. 623-18.000.

Ancra Corporation: *See*—
Nordstrom, Arnold, 4,878,635, Cl. 244-137.100.

Andermo, Nils I., to Mitutoyo Corporation. Capacitance-type measuring device for absolute measurement of positions. 4,879,508, Cl. 324-61.00R.

Anders, Edward O., to Anders Energy Corporation. Method and system for maintaining and producing horizontal well bores. 4,878,539, Cl. 166-303.000.

Anders Energy Corporation: *See*—
Anders, Edward O., 4,878,539, Cl. 166-303.000.

Anderson, Cynthia E.: *See*—
Ruggierio, Paul A.; and Anderson, Cynthia E., 4,878,770, Cl. 388-308.000.

Anderson, John E., to Union Carbide Corporation. Fuel jet burner and combustion method. 4,878,829, Cl. 431-8.000.

Anderson, Michael W.: *See*—
Badger, Ernest E.; Sornberger, G. Russell; and Anderson, Michael W., 4,878,613, Cl. 229-75.000.

Ando, Shigeru, to Fuji Photo Film Co., Ltd. Magnetic disc pack loading mechanism. 4,879,616, Cl. 360-99.060.

Ando, Takayuki; Ishiguro, Kazuyoshi; Matsui, Kenji; Yamashita, Tatsuo; and Kondo, Toshikatsu, to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho. Guide rail supporting structure. 4,878,692, Cl. 280-804.000.

Andou, Hideki: *See*—
Nakabayashi, Takeo; and Andou, Hideki, 4,879,715, Cl. 370-92.000.

Andreas, David W.: *See*—
Watkins, James D.; Andreas, David W.; and Cox, David H., 4,878,765, Cl. 383-116.000.

Angelini Pharmaceuticals Ltd.: *See*—
Schoenwald, Ronald D., 4,879,294, Cl. 514-253.000.
Schoenwald, Ronald D., 4,879,304, Cl. 514-374.000.

Angio-Medical Corporation: *See*—
Catsimpoolas, Nicholas; Kamarei, Ahmad R.; Griffith, Ann L.; and Sinn, Robert S., 4,879,114, Cl. 424-95.000.
Kamarei, Ahmad R.; Klibaner, Michael; and Peton, Denise, 4,879,312, Cl. 514-560.000.

Anis, Aziz Y. Flexible one-piece posterior chamber lens. 4,878,911, Cl. 623-6.000.

Anritsu Corporation: *See*—
Taguchi, Jisei; Miura, Yutaka; Iwanaga, Kenji; and Tada, Manabu, 4,879,536, Cl. 335-128.000.

Anscher, Joseph A.; and Dillner, James, to National Molding Corp. Cord fastener. 4,878,269, Cl. 24-115.00G.

Anthon, Douglas W.: *See*—
Dixon, George J.; Anthon, Douglas W.; and Clark, John H., 4,879,722, Cl. 372-21.000.
Dixon, George J.; Anthon, Douglas W.; and Clark, John H., 4,879,723, Cl. 372-21.000.

Antonio, Franklin P.: *See*—
Shumate, William A.; Kindred, Daniel R.; Antonio, Franklin P.; Gardner, Steven H.; Kelkar, Krishnanand; Bilotta, Thomas R.; and Rogers, Steven L., 4,879,720, Cl. 371-43.000.

Antoon, Mitchell K., Jr., to Hercules Incorporated. Process for producing uniaxial polyolefin/filler films for controlled atmosphere packaging. 4,879,078, Cl. 264-41.000.

Aoki, Hideki; Murata, Mitsuru; and Sakamoto, Hirotaka, to Mitsubishi Denki Kabushiki Kaihsa. Blower motor control for an air conditioner. 4,879,503, Cl. 318-809.000.

Aoki, Katsunori: *See*—
Sometani, Taro; Takaoka, Naotoshi; Aida, Mitsuo; Kudomi, Mitsuharu; Tanahashi, Yasuhiro; and Aoki, Katsunori, 4,879,509, Cl. 324-108.000.

Aoki, Makoto: *See*—
Homma, Kazuya; Nogi, Hiroshi; Yamada, Koichi; Kitazume, Masahiro; Uzawa, Masamitsu; and Aoki, Makoto, 4,878,754, Cl. 356-376.000.

Aoki, Yoshihito: *See*—
Takashima, Makoto; Aoki, Yoshihito; and Oikawa, Takahiro, 4,879,658, Cl. 364-449.000.

Aoki, Yuji; and Miyazaki, Hiroaki, to Mitsubishi Monsanto Chemical Company. Heat and impact resistant resin composition. 4,879,343, Cl. 525-71.000.

Aoyagi, Yoshio; Hirano, Hiroyuki; Kimura, Toshiyuki; Niinuma, Susumu; Yoshioka, Minoru; Haeno, Akira; Sato, Takashi; Nishi, Yoshiro; Watanabe, Yoshihiko; Yokogawa, Fumihiko; Matsumoto, Keiichi; and Ogawa, Youichi, to Pioneer Electronic Corporation. Automatic loading disc player. 4,879,705, Cl. 369-32.000.

Apps, Howard R.; Lucas, Adrian D.; and Fairhall, Philip C., to British Aerospace Public Limited Company. Apparatus for forming elongate structural components. 4,878,369, Cl. 72-12.000.

Arai, Masumi: *See*—
Ootsuka, Yoshinori; Atsumi, Kinya; Arai, Masumi; and Hattori, Tadashi, 4,879,139, Cl. 427-38.000.

Arai, Yoshihiro; Sasaki, Kouji; and Ohsaki, Takanori, to Mitutoyo Mfg. Co., Ltd. Variable capacitance type encoder. 4,879,552, Cl. 340-870.370.

Arakawa, Satoshi: *See*—
Hosoi, Yuichi; Arakawa, Satoshi; and Takahashi, Kenji, 4,879,202, Cl. 430-139.000.

Arambepola, Bernard, to General Electric Company p.l.c., The. Azimuth processor for SAR system having plurality of interconnected processing modules. 4,879,559, Cl. 342-25.000.

Arbel, Ygal, to International Business Machines Corporation. Half-duplex speakerphone. 4,879,745, Cl. 379-389.000.

Arco Chemical Technology, Inc.: *See*—
Younes, Usama E., 4,879,164, Cl. 428-209.000.

Arden, Terence J.: *See*—
Aune, Jan E.; Arden, Terence J.; and Yap, Mary S., 4,879,752, Cl. 382-1.000.

Arikado, Tsunetoshi; Sekine, Makoto; Okano, Haruo; and Horiike, Yasuhiro, to Kabushiki Kaisha Toshiba. Method of dry etching and apparatus for use in such method. 4,878,995, Cl. 156-643.000.

Arizona Board of Regents: *See—*
Pettit, George R.; and Kamano, Yoshiaki, 4,879,278, Cl. 514-17.000.

Arizona Chemical Company: *See—*
Schluenz, Robert W., 4,879,351, Cl. 525-332.100.

Armstrong, William F.: *See—*
Filisko, Frank E.; and Armstrong, William F., 4,879,056, Cl. 252-74.000.

Arnold, Jane J.: *See—*
Willard, Miles J.; Arnold, Jane J.; and Hix, Veldon M., 4,879,126, Cl. 426-272.000.

Arnquist, David C., to Texas Instruments Incorporated. Robot gripper passively locked. 4,878,705, Cl. 294-116.000.

Art Materials Service, Inc.: *See—*
Cubides, Wilson J., 4,878,266, Cl. 16-225.000.

Aruga, Masayoshi: *See—*
Konno, Yutaka; Kawata, Hiroitsu; Aruga, Masayoshi; Sonobe, Takashi; and Mitomi, Mitsuo, 4,879,119, Cl. 424-449.000.

Asahi Glass Company, Ltd.: *See—*
Misuda, Katsutoshi; and Hasegawa, Takafumi, 4,879,166, Cl. 428-212.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Nakamura, Masao; and Tonokawa, Hiroshi, 4,878,520, Cl. 138-149.000.
Wallace, Robert B.; and Itoh, Hirataka, 4,879,226, Cl. 435-68.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Negishi, Kiyoshi, 4,879,459, Cl. 250-205.000.

Asakura, Hiroshi, to Toyo Chemical Co., Ltd. Method for continuously manufacturing synthetic resin tube. 4,878,976, Cl. 156-190.000.

Asakura, Koichi; Demura, Makoto; and Matsumoto, Takenori, to Brother Kogyo Kabushiki Kaisha. Thread cutting machine with synchronized feed and rotation motors. 4,879,660, Cl. 364-474.150.

Asakura, Toshimitsu, to Honda Giken Kogyo Kabushiki Kaisha. Front fork of a motorcycle. 4,878,558, Cl. 180-219.000.

Asami, Masahiro, to Fuji Photo Film Co., Ltd. Silver halide color photographic material. 4,879,206, Cl. 430-550.000.

Ashby, David P.; and Green, Charles J., to GT Development Corporation. Quick vent valve for air brake line. 4,878,513, Cl. 137-102.000.

Ashizawa, Tadashi: *See—*
Saito, Hiromitsu; Uosaki, Yoichi; Sato, Akira; Hirata, Tadashi; Morimoto, Makoto; and Ashizawa, Tadashi, 4,879,386, Cl. 544-343.000.

Ashland Oil, Inc.: *See—*
Goel, Anil B.; and Holehouse, Joseph G., 4,878,978, Cl. 156-272.400.

Asics Corporation: *See—*
Kiyosawa, Junichi, 4,878,301, Cl. 36-69.000.

Assel, Eugen; Dasbach, Burkhard; and Gebhard, Bruno, to Siemens Aktiengesellschaft. Subassembly case including a flat sheet metal shield fastened with V-shaped spring clips. 4,879,434, Cl. 174-35.00R.

Astrom, Anders F.: *See—*
Schleimann-Jensen, Lars J.; Engding, Alf E.; and Astrom, Anders F., 4,879,460, Cl. 250-230.00R.

AT&T Bell Laboratories: *See—*
Bean, John C.; and Ourmazd, Abbas, 4,879,256, Cl. 437-131.000.
Fatehi, Mohammad T., 4,878,726, Cl. 350-96.150.
Johnston, Wilbur D., Jr.; and Tu, Charles W., 4,878,956, Cl. 148-33.300.
Picone, Joseph; and Prezas, Dimitrios, 4,879,748, Cl. 381-49.000.

AT&T Information Systems Inc.: *See—*
Burke, Edmund T.; Dawdy, Daniel H.; and Rubert, Timothy M., 4,879,743, Cl. 379-142.000.
Smith, Douglas C., 4,879,507, Cl. 324-57.00N.

ATEQ Corporation: *See—*
Warkentin, Paul A.; Rieger, Michael L.; Michalski, Chris A.; and Jolley, Matthew J., 4,879,605, Cl. 358-296.000.

Atlantic Richfield Company: *See—*
Abel, James C., 4,878,377, Cl. 73-59.000.
Sofranko, John A., 4,879,427, Cl. 585-500.000.

Atochem: *See—*
Poisson, Pierre; Rivas, Nadine; and Deloy, Pierre, 4,879,327, Cl. 524-93.000.

Atsumi, Kinya: *See—*
Ootsuka, Yoshinori; Atsumi, Kinya; Arai, Masumi; and Hattori, Tadashi, 4,879,139, Cl. 427-38.000.

Atsumi, Shigeru; Tanaka, Sumio; Saito, Shinji; and Otsuka, Nobauki, to Kabushiki Kaisha Toshiba. Nonvolatile semiconductor memory device. 4,879,689, Cl. 365-201.000.

Audimax, Inc.: *See—*
Levitt, Harry; Dugot, Richard S.; and Kopper, Kenneth W., 4,879,749, Cl. 381-68.400.

Auer, Robert T.; and Reina, David, to Buddy L Corporation. Plug-in module for motorized toy vehicle. 4,878,877, Cl. 446-463.000.

Aune, Jan E.; Arden, Terence J.; and Yap, Mary S., to MacMillan Bloedel Limited. Lumber optimizer. 4,879,752, Cl. 382-1.000.

Ausnit, Steven, to Minigrip, Inc. Double hinge zipper construction. 4,878,763, Cl. 383-65.000.

Austin, Henry T., to PPG Industries, Inc. Method of cationic electrodeposition using dissolution resistant anodes. 4,879,013, Cl. 204-180.200.

Avdel Systems Limited: *See—*
Woodrow, Michael; and Lacey, Raymond D., 4,878,795, Cl. 411-501.000.

Axis S.p.A.: *See—*
Santandrea, Luciano; and Lombardi, Massimo, 4,878,292, Cl. 29-734.000.

B.F. Goodrich Company, The: *See—*
Baden, Bradley J.; and Warren, John H., 4,878,563, Cl. 188-71.500.
Putt, James C.; and Hohenshil, Robert N., 4,878,647, Cl. 251-30.050.
Stanislawczyk, Vic, 4,879,364, Cl. 526-318.200.

Baba, Youichiro; Hashimoto, Hirofumi; and Watanabe, Masayuki, to Toyota Jidosha Kabushiki Kaisha. Throttle device for high viscosity paint. 4,878,649, Cl. 251-121.000.

Babbitt, Richard W.: *See—*
Stern, Richard A.; and Babbitt, Richard W., 4,879,562, Cl. 343-700.0MS.

Bach, Hanswilhelm; Bahrmann, Helmut; Cornils, Boy; Gick, Wilhelm; Heim, Volker; Konkol, Werner; and Wiebus, Ernst, to Hoechst Aktiengesellschaft. Process for the preparation of aldehydes. 4,879,418, Cl. 568-454.000.

Baden, Bradley J.; and Warren, John H., to B.F. Goodrich Company, The. Brake apparatus. 4,878,563, Cl. 188-71.500.

Badger, Ernest E.; Sornberger, G. Russell; and Anderson, Michael W., to Moore Business Forms. Envelope for table top laser printer. 4,878,613, Cl. 229-75.000.

Badia, Jose M., to Hiab Foco AB. Distributor for hydraulic cylinders. 4,878,418, Cl. 91-421.000.

Bado, Zoltan: *See—*
Tari, Gabor; Bado, Zoltan; and Juhasz, Imre, 4,878,918, Cl. 623-22.000.

Badone, Domenico: *See—*
Chiarino, Dario; Della Bella, Davide; Jommi, Giancarlo; Badone, Domenico; Pagliarin, Roberto; and Tavecchia, Paolo, 4,879,068, Cl. 260-397.000.

Bagwell, J. Jewell. Single handle dual flushing toilet. 4,878,256, Cl. 4-326.000.

Bahm, Glenn A., to Mobility Work Trays, Inc. Wheelchair work tray. 4,878,685, Cl. 280-304.100.

Bahrmann, Helmut: *See—*
Bach, Hanswilhelm; Bahrmann, Helmut; Cornils, Boy; Gick, Wilhelm; Heim, Volker; Konkol, Werner; and Wiebus, Ernst, 4,879,418, Cl. 568-454.000.

Baker, Bruce E.: *See—*
Larock, Richard C.; and Baker, Bruce E., 4,879,426, Cl. 585-469.000.

Baker, Keith G. Relating to energy conversion apparatus. 4,878,807, Cl. 416-7.000.

Baldwin, Thomas O.; Holzman, Thomas F.; Satoh, Paul S.; and Yein, Frederick S. Linker compounds, linker-compound-ligands and linker-compound-receptors. 4,879,249, Cl. 436-543.000.

Ball Corporation: *See—*
MacIntyre, Alan D., 4,879,700, Cl. 368-117.000.

Ballance, Jeffrey D.: *See—*
Bowlin, William P.; Knerr, Michael P.; and Ballance, Jeffrey D., 4,879,659, Cl. 364-468.000.

Balsamico, William A.; and Minnick, Walter J., Jr. Ice measuring and dispensing machine. 4,878,523, Cl. 141-114.000.

Balzer, Marion: *See—*
Henkels, Wolf-Dieter; and Balzer, Marion, 4,879,306, Cl. 514-441.000.

Ban, Kunikatsu: *See—*
Kawano, Hitoshi; Hayashi, Mitsuhiro; Yamamoto, Yukio; and Ban, Kunikatsu, 4,879,445, Cl. 219-64.000.

Banasiak, Lothar; Edlich, Wilfried; Lyr, Horst; Nega, Eva; and Sunkel, Marianne, to Institut fuer Pflanzenschutzforschung Kleinmachnow der Akademie der Landwirtschaftswissenshafen der DDR. N-alkyl-2,6-dimethylmorpholinocarboxamide salts, their preparation, and their use as fungicides. 4,879,291, Cl. 514-237.800.

Bancroft, Beverly: *See—*
Bancroft, Darl; and Bancroft, Beverly, 4,878,586, Cl. 211-106.000.

Bancroft, Darl; and Bancroft, Beverly. Rack and tube member for organizing electrical cords. 4,878,586, Cl. 211-106.000.

Bando Chemical Industries, Ltd.: *See—*
Kitabayashi, Masayuki; and Tanaka, Michio, 4,878,886, Cl. 474-204.000.

Banjo, Toshinobu: *See—*
Mori, Ryuichiro; Osaka, Syuichi; and Banjo, Toshinobu, 4,878,610, Cl. 228-6.200.

Banks, Robert L.: *See—*
Kukes, Simon G.; Banks, Robert L.; and Harris, Jesse R., 4,879,425, Cl. 585-350.000.

Banks, Roger L.: *See—*
Hsu, Chien-Yeh; McGee, Frank J.; and Banks, Roger L., 4,878,278, Cl. 28-142.000.

Banniza, Harry W.; and Bowlin, Robert D. Sign. 4,878,303, Cl. 40-606.000.

Banties, John Henry; and Donegan, Thomas Edward, to BASF Corp. Process for conditioning crude polyhalogenated pigments using a heterocyclic organic solvent. 4,879,380, Cl. 540-137.000.

Banus Garcia, Fernando. Apparatus for controlling start up and stop down of a hydraulic pump. 4,879,439, Cl. 200-81.90M.

Baradaran, Hamid R.: *See—*
Virdee, Nirmal S.; and Baradaran, Hamid R., 4,879,730, Cl. 375-106.000.

Barahia, Manoj M., to Century Electric, Inc. Molded multi-part generator fan. 4,879,483, Cl. 310-63.000.

Barnett, Charles J., to Kent Adhesive Products Co. Book binding reinforcement. 4,879,149, Cl. 428-41.000.

Barnhart, James. Compaction roller. 4,878,544, Cl. 172-40.000.

Barnthaler, Franz; and Rutkowski, Krzysztof, to Voest-Alpine Aktiengesellschaft. Cutting machine for cutting and carrying away material from a work face. 4,878,714, Cl. 299-67.000.

Barr, John D., to Reed Tool Company Limited. Manufacture of rotary drill bits. 4,878,403, Cl. 76-107.00R.

Barriac, Jacques J., to Owens-Illinois Closure Inc. Dispensing closure. 4,878,604, Cl. 222-209.000.

Barrow, Jeffrey G.; and Brokaw, Adrian P., to Analog Devices, Inc. Temperature and power supply compensation circuit for integrated circuits. 4,879,505, Cl. 323-312.000.

Bartky, W. Scott; Paton, Anthony D.; Temple, Stephen; and Michaelis, A. John, to AM International, Inc. Droplet deposition apparatus. 4,879,568, Cl. 346-140.00R.

Bartoli, Francesco: *See—*
Pittalis, Francesco; Bartoli, Francesco; and Farias, Otello, 4,879,036, Cl. 210-500.380.

Barton, Nicholas; Billing, Robert; and Burgess, Paul K., to Questech Limited. Processing of video image signals. 4,879,597, Cl. 358-88.000.

Bartz, Volker: *See—*
Seyffart, Gunther; Rothe, Wolfgang; Bartz, Volker; and Bartz, Volker, 4,879,280, Cl. 514-53.000.
Seyffart, Gunther; Rothe, Wolfgang; Bartz, Volker; and Bartz, Volker, 4,879,280, Cl. 514-53.000.

BASF Aktiengesellschaft: *See—*
Hoppe, Klaus-Dieter; Leutner, Bernd; and Schreiner, Siegfried, 4,879,102, Cl. 423-235.000.
Lausberg, Dietrich; Seiler, Erhard; and Braun, Hans-Georg, 4,879,324, Cl. 523-400.000.
Merger, Franz; Frank, Juergen; Vagi, Uwe; and Fischer, Rolf, 4,879,406, Cl. 560-211.000.
Naeumann, Fritz; Hoelderich, Wolfgang; and Merger, Franz, 4,879,405, Cl. 560-211.000.
Rehmer, Gerd; Niessner, Manfred; Heide, Wilfried; Hartmann, Heinrich; and Peters, Karl-Clemens, 4,879,361, Cl. 526-201.000.
Sterzel, Hans-Josef, 4,879,065, Cl. 252-600.000.
Wehr, Rudolf, 4,879,120, Cl. 524-430.000.

BASF Corp.: *See—*
Banties, John Henry; and Donegan, Thomas Edward, 4,879,380, Cl. 540-137.000.

Bastgen, Wendel, to Alb. Klein GmbH & Co. KG. Dewatering device with two filtering belts. 4,879,034, Cl. 210-400.000.

Battelle Memorial Institute: *See—*
Boiarski, Anthony A.; and Myers, William M., 4,878,727, Cl. 350-96.170.

Battenfeld Fischer Blasformtechnik GmbH: *See—*
Wollschlager, Dieter; and Scharrenbroich, Helmut, 4,878,828, Cl. 425-541.000.

Bauer, Walter, to Borg-Warner Automotive GmbH. Method for the production of friction plates, synchronizing blocker rings or similar structures. 4,878,282, Cl. 29-149.50C.

Baugh, Benton F. Hydraulic stab connector with angular freedom. 4,878,783, Cl. 405-169.000.

Baughman, Ray H.: *See—*
Maxfield, MacRae; Baughman, Ray H.; Igbal, Zafar; and Eckhardt, Helmut, 4,879,270, Cl. 505-1.000.

Baumgartner, Kenneth A.; and Pickering, William, to Caterpillar Industrial Inc. Voltage transients. 4,879,623, Cl. 361-33.000.

Baxter International Inc.: *See—*
Prince, Paul R.; Ford, Michael G.; Schoendorfer, Donald W.; and Clark, Ronald L., 4,879,040, Cl. 210-637.000.

Bay Mills Limited: *See—*
Woiceshyn, D. Mark, 4,879,163, Cl. 428-198.000.

Bayer Aktiengesellschaft: *See—*
Botta, Artur; and Jabs, Gert, 4,879,368, Cl. 528-397.000.
Chen, Yen-rong; Yang, Ming-he; Huang, Liang; Liu, Geng-tao; and Benz, Ulrich, 4,879,390, Cl. 548-453.000.
Elbe, Hans-Ludwig; Buchel, Karl H.; Schaller, Klaus; and Plempel, Manfred, 4,879,385, Cl. 514-383.000.
Jager, Gerhard; Jautelat, Manfred; Kramer, Wolfgang; Buchel, Karl H.; Reinecke, Paul; Brandes, Wilhelm; Hanssler, Gerd; and Lurssen, Klaus, 4,878,939, Cl. 71-92.000.
Knofel, Hartmut; Brockelt, Michael; Penninger, Stefan; and Stutz, Herbert, 4,879,408, Cl. 560-330.000.
Knofel, Hartmut; Brockelt, Michael; Penninger, Stefan; and Stutz, Herbert, 4,879,409, Cl. 560-330.000.
Kress, Hans-Jurgen; Paul, Winfried; Peters, Horst; Lindner, Christian; and Buekers, Josef, 4,879,342, Cl. 525-67.000.
Kurka, Peter; and Goetze, Leppold, 4,879,290, Cl. 514-223.200.
Piejko, Karl-Erwin; Bomer, Bruno; Buysch, Hans-Josef; and Hullmann, Michael, 4,879,367, Cl. 528-371.000.
Reiners, Jurgen; Podszun, Wolfgang; Winkel, Jens; Suling, Carlhans; and Klein, Gerhard, 4,879,402, Cl. 560-26.000.
Schade, Gerold; Paulus, Wilfried; and Schmitt, Hans-Georg, 4,879,310, Cl. 514-519.000.

Baylor Research Foundation: *See—*
Judy, Millard M.; Matthews, James L.; Newman, Joseph T.; and Sogandares-Bernal, Franklin, 4,878,891, Cl. 604-5.000.

BBC Brown Boveri Aktiengesellschaft: *See—*
Meinhold, Henner; Ziegenbein, Botho; and Petri, Gunther, 4,879,188, Cl. 429-7.000.

Beam, John W.: *See—*
Paquette, Edmund T.; and Beam, John W., 4,878,583, Cl. 211-41.000.

Bean, John C.; and Ourmazd, Abbas, to AT&T Bell Laboratories. Method of controlling the order-disorder state in a semiconductor device. 4,879,256, Cl. 437-131.000.

Beattie, Morris J.: *See—*
Raudsepp, Rein; and Beattie, Morris J., 4,878,945, Cl. 75-118.00R.

Beattie, Thomas B.; Schweinberg, Fred M.; and Rutzen, Ronald L. Drain channel alignment and installation apparatus. 4,878,782, Cl. 405-119.000.

Beattle, John M.: *See—*
Roy, Michael G.; Ullrich, Helmut J.; Beattle, John M.; and Sinden, Jimmie D., 4,878,340, Cl. 56-249.000.

Bechtold, Stephen K. Chain assembly and method for making the same. 4,878,345, Cl. 59-15.000.

Beck, Lee R.; and Stolle, Ralph J., to Stolle Research and Development Corporation. Antihypertensive hyperimmune milk, production, composition, and use. 4,879,110, Cl. 424-85.800.

Becker, Reinhard: *See—*
Teetz, Volker; Geiger, Rolf; Urbach, Hansjorg; Becker, Reinhard; and Scholkens, Bernward, 4,879,403, Cl. 560-38.000.

Beckey, Thomas J.; and Nelson, Lorne W., to Honeywell Inc. Method and apparatus for improving cooling of a compressor element in an air conditioning system. 4,878,355, Cl. 62-115.000.

Becton, Dickinson and Company: *See—*
Oberhardt, Bruce J.; and Palmer, Phyllis J., 4,879,098, Cl. 422-101.000.

Beecham Group p.l.c.: *See—*
Orr, Norman A.; and Greenway, Michael J., 4,879,287, Cl. 514-171.000.

Beenker, Franciscus P. M.: *See—*
Sauerwald, Wilhelm A.; DeWilde, Johannes; Van Eerdewijk, Karel J. E.; Beenker, Franciscus P. M.; and Segers, Marinus T. M., 4,879,717, Cl. 371-22.300.

Beery, Jack, to Mead Corporation, The. Cartridge for web-type media material. 4,878,581, Cl. 206-416.000.

Behr, Hans; and Vetter, Kurt, to Behr Industrieanlagen GmbH & Co. Method and apparatus for electrostatic coating with conductive material. 4,879,137, Cl. 427-27.000.

Behr Industrial Equipment Inc.: *See—*
Cann, Roger S., 4,878,454, Cl. 118-663.000.

Behr Industrieanlagen GmbH & Co.: *See—*
Behr, Hans; and Vetter, Kurt, 4,879,137, Cl. 427-27.000.

Behringer, John W. Water resistant control linkage. 4,878,402, Cl. 74-10.800.

Bejui, Jacques: *See—*
Rhenter, Jean-Luc; and Collomb, Jean, 4,878,916, Cl. 623-18.000.

Bekedam, Martin. Zero flash closed condensate boiler feedwater system. 4,878,457, Cl. 122-441.000.

Bell, Kenneth M., to Texas Instruments Incorporated. Constant current drive circuit with reduced transient recovery time. 4,879,524, Cl. 330-288.000.

Beloit Corporation: *See—*
Cronin, Dennis C., 4,879,001, Cl. 162-206.000.
Wedel, Gregory L., 4,878,299, Cl. 34-35.000.

Belzer, Folkert D.; and Southard, James H., to Wisconsin Alumni Research Foundation. Solution for the preservation of organs. 4,879,283, Cl. 514-60.000.

Bendix Electronics S.A.: *See—*
Boucard, Michel; Thirion, Christian; and Maurel, Christian, 4,879,630, Cl. 361-386.000.

Bennet, Andrew H., deceased (by Davies, David H., executor), to Diamant Boart Cralius Ltd. Wire line core barrel. 4,878,549, Cl. 175-248.000.

Bennett, Stephen H., to United States of America, Army. Reinforced utility mat adaptable as military overhead foxhole cover and foot suspension bridge. 4,879,154, Cl. 428-81.000.

Benz, Ulrich: *See—*
Chen, Yen-rong; Yang, Ming-he; Huang, Liang; Liu, Geng-tao; and Benz, Ulrich, 4,879,390, Cl. 548-453.000.

Berding, Josef; Bertling, Hannes; Lees, Thomas; and Pabst, Carsten, to Robert Bosch GmbH. Piston accumulator. 4,878,519, Cl. 138-31.000.

Berge, Ronald J. Log-cornered siding for buildings. 4,878,328, Cl. 52-233.000.

Bergene, Mark A.: *See—*
Moon, Seaton; and Bergene, Mark A., 4,878,559, Cl. 180-244.000.

Bergeron, Mark M.: *See—*
Schreckendgust, Jay G.; Pantelleria, James E.; and Bergeron, Mark M., 4,879,734, Cl. 378-57.000.

Berglund, David M.: *See—*
Rosenthal, Bruce C.; Zill, Kevin L.; Claerbaut, Kevin R.; Berglund, David M.; and Grover, Kenneth L., 4,878,524, Cl. 144-356.000.

Bergman, Ulf; Sommer, Jurgen; and Borggren, Arne, to Siemens Aktiengesellschaft. X-ray examination apparatus. 4,879,736, Cl. 378-181.000.

Berman, Arthur L., to Kaiser Aerospace & Electronics Corp. Multiple image, single display system and method. 4,879,603, Cl. 358-242.000.

Bernauer, Larry W. Heart puzzle. 4,878,670, Cl. 273-158.000.

Bertin & Cie: *See—*
Facon, Pierre, 4,878,417, Cl. 91-363.00R.

Bertling, Hannes: *See—*
Berding, Josef; Bertling, Hannes; Lees, Thomas; and Pabst, Carsten, 4,878,519, Cl. 138-31.000.

Bertoncini, Joseph, to Biomedical Research and Development Laboratories, Inc. Tubeless cell harvester. 4,879,431, Cl. 435-311.000.

Bertrams, Josef: *See—*
Grecksch, Hans; Bertrams, Josef; and Bucken, Rene, 4,878,629, Cl. 242-18.0PW.

Bertsch, Jack E.; and Kopp, Harold P., to Polytronics, Inc. Circuit tester construction. 4,878,852, Cl. 439-103.000.

Berveiller, Marcel: *See—*
Muller, Jean F.; Tollitte, Francois G.; Krier, Gabriel; Dominiak, Serge; Eberhardt, Andre; and Berveiller, Marcel, 4,879,467, Cl. 250-288.000.

Besemann, Alfred, to E.C.H. Will GmbH. Method of and apparatus for gathering and manipulating stacks of paper sheets and the like. 4,878,659, Cl. 271-218.000.

Bessho, Kazuo, to Kanazawa University. Laminated coil for an eddy-current type strong AC magnetic field generator. 4,879,539, Cl. 335-299.000.

Beyrich, Jurgen: *See—*
Albrecht, Bernhard; and Beyrich, Jurgen, 4,879,415, Cl. 564-412.000.

Bhattacharya, Ajit K., to Texaco Inc. Catalyst for preparation of dimethyl carbonate. 4,879,266, Cl. 502-164.000.

Bibber, John W., to Sanchem, Inc. Corrosion resistant aluminum coating composition. 4,878,963, Cl. 148-262.000.

Bichot, Bernard; and Louis, Bernard, to Isover Saint-Gobain. Apparatus for the heat treatment of insulating materials using microwave energy and hot gas. 4,879,444, Cl. 219-10.55A.

Biegger, Dennis, to Eveready Battery Company. Battery terminal fuse. 4,879,187, Cl. 429-7.000.

Bieri Pumpenbau AG: *See—*
Akerman, Paul; and Meyer, Wolfram, 4,878,804, Cl. 415-111.000.

Bilek, Andrew G.: *See—*
Foster, Joseph C., Jr.; and Bilek, Andrew G., 4,878,415, Cl. 89-34.000.

Billing, Robert: *See—*
Barton, Nicholas; Billing, Robert; and Burgess, Paul K., 4,879,597, Cl. 358-88.000.

Bilotta, Thomas R.: *See—*
Shumate, William A.; Kindred, Daniel R.; Antonio, Franklin P.; Gardner, Steven H.; Kelkar, Krishnanand; Bilotta, Thomas R.; and Rogers, Steven L., 4,879,720, Cl. 371-43.000.

Bilweis, Joseph, to Ethicon, Inc. Perihepatic prosthesis. 4,878,890, Cl. 600-37.000.

Binder, Rolf; Staeheli, Paul; Staehli, Urs; and Knabenhans, Fritz, to Rieter Machine Works Ltd. Feed chute arrangement for textile machines, such as carding machines. 4,878,784, Cl. 406-70.000.

Biogen, Inc.: *See—*
Wallner, Barbara P.; Pepinsky, R. Blake; and Garwin, Jeffrey L., 4,879,224, Cl. 435-68.000.

Biomedical Research and Development Laboratories, Inc.: *See—*
Bertoncini, Joseph, 4,879,431, Cl. 435-311.000.

Birek, Peter: *See—*
McCulloch, Christopher A. G.; and Birek, Peter, 4,878,841, Cl. 433-72.000.

Birkert, Karl; and Marburger, Heinz, to Rowenta-Werke GmbH. Electric toaster. 4,878,423, Cl. 99-332.000.

Birmingham, Virginia A.; and Seno, Eugene T., to Eli Lilly and Company. Tylosin resistance-conferring gene, designated tlrB, for use in streptomyces and other organisms. 4,879,241, Cl. 435-253.500.

Birrell, G. Bruce: *See—*
Mrsny, Randall J.; Birrell, G. Bruce; and Volwerk, Johannes J., 4,879,220, Cl. 435-7.000.

Birsa, Ludwig. Fuel supply system for internal combustion engines. 4,878,475, Cl. 123-525.000.

Birth, Winfried: *See—*
Wilhelm, Wilhelm; and Birth, Winfried, 4,879,530, Cl. 331-45.000.

Bisbing, Robert H., to Southco, Inc. Binary coded key and latch-actuator. 4,878,367, Cl. 70-491.000.

Bissell, Inc.: *See—*
Rosendall, Henry J., 4,878,261, Cl. 15-41.00R.

Bittner, Ronny E., to Walt Disney Company, The. Method and apparatus for stabilizing and powering walking animated figures. 4,878,878, Cl. 446-139.000.

Blair, Thomas R.: *See—*
van Swam, Leo F.; Blair, Thomas R.; and Ho, Quang D., 4,879,088, Cl. 376-252.000.

Blanton, Russell W.: *See—*
Stearns, Thornton; and Blanton, Russell W., 4,878,354, Cl. 62-63.000.

Blaser, Theobald: *See—*
Spiegel, Nikolaus; Krestyn, Karlheinz; and Blaser, Theobald, 4,879,513, Cl. 324-207.000.

Blass, Karl G. Gastrointestinal module: a nonsurgical implant. 4,878,905, Cl. 604-891.100.

Blevins, Charles H., II: *See—*
Foster, George N.; Petty, Herbert E.; and Blevins, Charles H., II, 4,879,378, Cl. 556-439.000.

Blockinger, Larry A. High security window. 4,878,314, Cl. 49-381.000.

Blomquist, Leonard A., to Continental Plastic Containers, Inc. Apparatus for applying a label to an open mold half. 4,878,823, Cl. 425-116.000.

Blyth, Randolph C.; and Ucci, Pompelio A., to Monsanto Company. Stain-resistant nylon fibers. 4,879,180, Cl. 428-395.000.

Board of Regents Acting for and on Behalf of University of Michigan: *See—*
Filisko, Frank E.; and Armstrong, William F., 4,879,056, Cl. 252-74.000.

Board of Regents, The University of Texas System: *See—*
Shemwell, David M.; and Cantrell, Cyrus D., 4,879,532, Cl. 330-4.300.

Boda, James C.; and Slattery, Gordon C., to Brunswick Corporation. Cowl assembly for an outboard motor. 4,878,468, Cl. 123-195.00P.

Boehringer Mannheim GMBH: *See—*
Hallermayer, Klaus; Looser, Siegfrid; and Katus, Hugo, 4,879,216, Cl. 435-7.000.

Boeing Company, The: *See—*
Chakravarty, Abhijit J. M.; Gangsaas, Dagfinn; and Moore, John B., 4,879,643, Cl. 364-148.000.
Chan, Eric Y., 4,879,250, Cl. 437-3.000.
Gottshall, R. Mare, 4,879,644, Cl. 364-167.010.
Julien, Gerald J.; and Robinson, Steven P., 4,878,565, Cl. 188-378.000.

Boese, Gerald J.: *See—*
Stolarczyk, Larry G.; Smoker, Kurt A.; Boese, Gerald J.; Mondt, William E.; Hasenack, Marvin L., Jr.; Zappanti, James L.; Smith, Seth A.; and Moore, Edward D., 4,879,755, Cl. 455-3.000.

Bogaty, Robert D., to Tretorn AB. Athletic shoe. 4,878,300, Cl. 36-35.00R.

Boge, Ferdinand. Bellows for protecting knuckle joints. 4,878,389, Cl. 74-18.100.

Boiarski, Anthony A.; and Myers, William M., to Battelle Memorial Institute. Multimode channel waveguide optical coupling devices and methods. 4,878,727, Cl. 350-96.170.

Boice, Peter R., to W. R. Grace & Co. Monoaxially oriented shrink film. 4,879,177, Cl. 428-339.000.

Bolte, Steven B.: *See—*
Gruber, Robert J.; Yourd, Raymond A., III; Julien, Paul C.; Knapp, John F.; and Bolte, Steven B., 4,879,199, Cl. 430-137.000.

Bomer, Bruno: *See—*
Piejko, Karl-Erwin; Bomer, Bruno; Buysch, Hans-Josef; and Hullmann, Michael, 4,879,367, Cl. 528-371.000.

Booth, Anthony J.: *See—*
McNally, Lance; Booth, Anthony J.; and Morley, Peter S., 4,879,716, Cl. 371-8.200.

Bopp, Richard C.; and Yates, John B., III, to General Electric Company. Blends of a silicone-polycarbonate block copolymer with a compatibilized alloy of polyphenylene ether resin/polyester resin. 4,879,346, Cl. 525-146.000.

Borg-Warner Automotive GmbH: *See—*
Bauer, Walter, 4,878,282, Cl. 29-149.50C.

Borg-Warner Automotive, Inc.: *See—*
Fox, Clarence D., 4,878,511, Cl. 137-38.000.

Borgens, Pauline B.: *See—*
Simpson, Howard D.; and Borgens, Pauline B., 4,879,265, Cl. 502-211.000.

Borggren, Arne: *See—*
Bergman, Ulf; Sommer, Jurgen; and Borggren, Arne, 4,879,736, Cl. 378-181.000.

Botta, Artur; and Jabs, Gert, to Bayer Aktiengesellschaft. Oligobenzylated hydroxycarboxylic acid derivative. 4,879,368, Cl. 528-397.000.

Botti, Edoardo; and Torazzina, Aldo, to SGS-Thomson Microelectronics, s.r.l. Integrated audio amplifier electronically commutable from a single ended or stereo configuration to a balanced or bridge configuration and viceversa. 4,879,526, Cl. 330-295.000.

Boucard, Michel; Thirion, Christian; and Maurel, Christian, to Bendix Electronics S.A. Housing for an electronic circuit. 4,879,630, Cl. 361-386.000.

Boudreau/Darque, Inc.: *See—*
Boudreau, Louis H.; and Ketterer, Scott R., 4,878,665, Cl. 273-34.00R.

Boudreau, Louis H.; and Ketterer, Scott R., to Boudreau/Darque, Inc. Golf cup advertising device and method. 4,878,665, Cl. 273-34.00R.

Boughton, John H.; Butz, Ralph A.; Cheng, Herman C. T.; Dennis, Jonathan R.; Hannon, Brian T.; and Weigel, Janet H., to Du Pont de Nemours, E. I., and Company. Manufacture of high purity hydrogen peroxide by using reverse osmosis osmosis. 4,879,043, Cl. 210-651.000.

Bourrieres, Pierre, to Manufacture d'Appareillage Electrique de Cahors. Apparatus for forming a filament-wound structure on a cylindrical pole. 4,878,984, Cl. 156-431.000.

Bourset, Claude; and Wajs, Georges, to Essilor International Cie Generale d'Optique. Method of manufacturing natural protein polymer contact lenses by molding and cross-linking. 4,879,072, Cl. 264-1.400.

Bowlin, Robert D.: *See—*
Banniza, Harry W.; and Bowlin, Robert D., 4,878,303, Cl. 40-606.000.

Bowlin, William P.; Knerr, Michael P.; and Ballance, Jeffrey D. Log processing systems. 4,879,659, Cl. 364-468.000.

Boyd, Richard M., to Quadion Corporation. High speed self-lubricating bearing-seal assembly. 4,878,766, Cl. 384-130.000.

Bozoyan, Edward. OTR safety urinal pumps. 4,878,819, Cl. 417-514.000.

BP Chemicals Limited: *See—*
Chamla, Claude; and Speakman, John G., 4,879,359, Cl. 526-105.000.
Kent, Alexander G., 4,879,070, Cl. 562-550.000.

Braham, R. Brian, to Northern Telecom Limited. Closure for telecommunications cable. 4,879,436, Cl. 174-92.000.

Bramley, David F., to Marconi Company Limited, The. Sighting system. 4,878,752, Cl. 356-152.000.

Brandenstein, Manfred; and Kober, Jurgen, to SKF GmbH. Tension arrangement for transmission belts. 4,878,885, Cl. 474-135.000.

Brandes, Wilhelm: *See—*
Jager, Gerhard; Jautelat, Manfred; Kramer, Wolfgang; Buchel, Karl H.; Reinecke, Paul; Brandes, Wilhelm; Hanssler, Gerd; and Lurssen, Klaus. 4,878,939, Cl. 71-92.000.

Brantigan, John W. Surgical prosthetic implant facilitating vertebral interbody fusion. 4,878,915, Cl. 623-17.000.

Braski, Michael T.; Wissman, Charles H.; Tilton, Richard A.; and Robusto, Paul F., to Hughes Aircraft Company. Phase locked laser array. 4,879,721, Cl. 372-18.000.

Brasse, Dierk: *See—*
Tigges, Burkhard; and Brasse, Dierk, 4,879,531, Cl. 331-65.000.

Braun, Hans-Georg: *See—*
Lausberg, Dietrich; Seiler, Erhard; and Braun, Hans-Georg, 4,879,324, Cl. 523-400.000.

Braun, Jeffrey J., to Motoroia, Inc. Shunt regulator. 4,879,506, Cl. 323-314.000.

Brazdil, James F., Jr.: *See—*
Toft, Mark A.; Brazdil, James F., Jr.; and Glaeser, Linda C., 4,879,264, Cl. 502-8.000.

Breaux, John R.: *See—*
Uddo Jr., Joseph F.; and Breaux, John R., 4,878,762, Cl. 383-33.000.

Bredemann, Michael V.; and Seitz, Forest S., to Honeywell Inc. Differential amplifier. 4,879,521, Cl. 330-258.000.

Brennan, Michael A.: *See—*
Toutant, Roy T.; Perry, David S.; Brennan, Michael A.; Kreko, James E.; and Dilk, Mark A., 4,878,368, Cl. 72-9.000.

Bresnahan, Pat. Concrete path paver. 4,878,778, Cl. 404-105.000.

Brewer, Arthur D., to Uniroyal Chemical Ltd./Uniroyal Chemical Ltee. Method for reducing serum uric acid levels. 4,879,276, Cl. 514-43.000.

Bright Star Technology, Inc.: *See—*
Gasper, Elon; and Goedert, Nedra, 4,878,844, Cl. 434-159.000.

Briguet, Etienne: *See—*
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Brinkman, Robert D.: *See—*
Guillot, Walter K.; and Brinkman, Robert D., 4,879,590, Cl. 358-10.000.

Brion, Francis; Buendia, Jean; and Marie, Christian, to Roussel Uclaf. Process for making perhydroindole-2-carbonxylic acid. 4,879,392, Cl. 548-492.000.

Bristol-Myers Company: *See—*
Brundidge, Steven P.; Howell, Henry G.; Sapino, Chester, Jr.; and Hong-Tann, Chou, 4,879,377, Cl. 536-18.200.

British Aerospace Public Limited Company: *See—*
Apps, Howard R.; Lucas, Adrian D.; and Fairhall, Philip C., 4,878,369, Cl. 72-12.000.

British-American Tobacco Company, Ltd.: *See—*
Case, Paul D.; and Dittrich, David J., 4,878,507, Cl. 131-336.000.

British Hydromechanics Research Association, The: *See—*
Heron, Roger A.; and Saunders, David H., 4,878,785, Cl. 406-194.000.

British Telecommunications, plc: *See—*
Webb, Roderick P., 4,879,761, Cl. 455-601.000.

Broadhurst, John H., to Sysmed, Inc. Linear particle accelerator with seal structure between electrodes and insulators. 4,879,518, Cl. 328-233.000.

Brock, John C., to TRW Inc. Photoionization optical filter and detector. 4,879,468, Cl. 250-374.000.

Brockelt, Michael: *See—*
Knofel, Hartmut; Brockelt, Michael; Penninger, Stefan; and Stutz, Herbert, 4,879,408, Cl. 560-330.000.
Knofel, Hartmut; Brockelt, Michael; Penninger, Stefan; and Stutz, Herbert, 4,879,409, Cl. 560-330.000.

Broder, Samuel: *See—*
Mitsuya, Hiroaki; and Broder, Samuel, 4,879,277, Cl. 514-49.000.

Brodnax, Timothy B., to International Business Machines Corporation. Parity generator circuit and method. 4,879,675, Cl. 364-738.000.

Brokaw, Adrian P.: *See—*
Barrow, Jeffrey G.; and Brokaw, Adrian P., 4,879,505, Cl. 323-312.000.

Brookes, David L., to Development Finance Corporation. Poker pool game. 4,878,664, Cl. 273-11.00R.

Brooks, Mark A.: *See—*
Daly, Paul D.; Brooks, Mark A.; Fallis, Robert E.; and Cerny, Mark S., 4,878,650, Cl. 251-129.150.

Brooks, Michael T.: *See—*
Cherry, Craig D.; Taussig, Andrew P.; and Brooks, Michael T., 4,879,456, Cl. 235-462.000.

Brostrom, Doris; and Ryman, Lennart, to Telefunken electronic GmbH. Semiconductor component. 4,879,586, Cl. 357-54.000.

Brother Kogyo Kabushiki Kaisha: *See—*
Asakura, Koichi; Demura, Makoto; and Matsumoto, Takenori, 4,879,660, Cl. 364-474.150.
Yamamoto, Takemi; and Sakakibara, Kenji, 4,879,579, Cl. 355-235.000.

Brouwer, Gerald A., to Rapistan Corp. Split-cam conveyor rollers. 4,878,578, Cl. 198-809.000.

Brouwer, Gerardus J.; and Zwambag, Henry, to Brouwer Turf Equipment Limited. Sod laying method. 4,878,542, Cl. 172-1.000.

Brouwer Turf Equipment Limited: *See—*
Brouwer, Gerardus J.; and Zwambag, Henry, 4,878,542, Cl. 172-1.000.

Brown, Donald D.: *See—*
Buckley, James A. V.; Brown, Donald D.; and Metzelfeld, Glenn S., 4,878,567, Cl. 192-18.00R.
Metzelfeld, Glenn S.; Buckely, James A. V.; and Brown, Donald D., 4,878,346, Cl. 60-588.000.

Brown, James B. Apparatus and method for pre-wire routing for buildings. 4,878,653, Cl. 254-134.3FT.

Brown University Research Foundation: *See—*
Gerritsen, Hendrik J., 4,878,717, Cl. 350-3.660.

Browning Corporation: *See—*
Rose, Clyde E., 4,878,308, Cl. 42-102.000.

Bruce, Sue, to Schlumberger Technology Corporation. Drilling fluid. 4,879,654, Cl. 364-422.000.

Bruderer AG: *See—*
Messner, Helmut, 4,878,288, Cl. 29-568.000.

Bruhn, Theodor. Device for evaluating and measuring human sensory perception. 4,878,384, Cl. 73-379.000.

Brundidge, Steven P.; Howell, Henry G.; Sapino, Chester, Jr.; and Hong-Tann, Chou, to Bristol-Myers Company. Nucleoside process. 4,879,377, Cl. 536-18.200.

Brune, Johannes, to Siemens Aktiengesellschtaft. Cabinet stiffener. 4,878,700, Cl. 292-241.000.

Brunfeldt, Robert J.; and Jackson, James C., to R. J. Brunfeldt Company, Inc. Automatic sample system for mass spectrometer. 4,879,458, Cl. 250-288.000.

Brunswick Corporation: *See—*
Boda, James C.; and Slattery, Gordon C., 4,878,468, Cl. 123-195.00P.

Brunton, James L., to Aerion Industries, Inc. Feed efficiency improvement composition. 4,879,115, Cl. 424-694.000.

Brush, Richard K., to Ampex Corporation. Apparatus and method for sync detection in digital data. 4,879,731, Cl. 375-116.000.

Bryan, William J.: *See—*
Perrotti, Patrick A.; Joffre, Paul F.; Karoutas, Zeses E.; Corsetti, Lawrence V.; Bryan, William J.; and Hatfield, Stephen C., 4,879,090, Cl. 376-462.000.

BT Industries AB: *See—*
Johansson, Lennart, 4,878,798, Cl. 414-280.000.

BTM Corporation: *See—*
Sawdon, Edwin G., 4,878,284, Cl. 29-243.530.

Buazza, Omar M.: *See—*
Lipscomb, N. Thornton; and Buazza, Omar M., 4,879,318, Cl. 522-42.000.

Buchanan, Michelle V.: *See—*
Wise, Marcus B.; and Buchanan, Michelle V., 4,879,472, Cl. 250-379.000.

Buchel, Karl H.: *See—*
Elbe, Hans-Ludwig; Buchel, Karl H.; Schaller, Klaus; and Plempel, Manfred, 4,879,385, Cl. 514-383.000.
Jager, Gerhard; Jautelat, Manfred; Kramer, Wolfgang; Buchel, Karl H.; Reinecke, Paul; Brandes, Wilhelm; Hanssler, Gerd; and Lurssen, Klaus, 4,878,939, Cl. 71-92.000.

Buck, Arnold L.; and Green, Allan C., to Polaroid Corporation. System and method of providing images from solid state sensor. 4,879,601, Cl. 358-213.220.

Buckely, James A. V.: *See—*
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Bucken, Rene: *See—*
Grecksch, Hans; Bertrams, Josef; and Bucken, Rene, 4,878,629, Cl. 242-18.0PW.

Buckley, James A. V.; Brown, Donald D.; and Metzelfeld, Glenn S., to Hayes Industrial Brake, Inc. Brake/locking differential. 4,878,567, Cl. 192-18.00R.

Buddy L Corporation: *See—*
Auer, Robert T.; and Reina, David, 4,878,877, Cl. 446-463.000.

Buekers, Josef: *See—*
Kress, Hans-Jurgen; Paul, Winfried; Peters, Horst; Lindner, Christian; and Buekers, Josef, 4,879,342, Cl. 525-67.000.

Buendia, Jean: *See—*
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Bujese, David P.; and Schmidt, Gary W., to Olin Hunt Specialty Products Inc. Method of high resolution of electrostatic transfer of a high density image to a receiving substrate. 4,879,184, Cl. 430-126.000.

BULL HN Information Systems Inc.: *See—*
McNally, Lance; Booth, Anthony J.; and Morley, Peter S., 4,879,716, Cl. 371-8.200.

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Dunham, Byron J.; Murray, Gary P.; and Bulla, Don A., 4,879,546, Cl. 340-632.000.

Bullis, Robert H.: *See—*
Wiegand, Walter J., Jr.; and Bullis, Robert H., 4,878,383, Cl. 73-293.000.

Bunce, Roger A.: *See—*
Whitehead, Thomas P.; Thorpe, Gary H. G. H.; Kricka, Larry J.; Gibbons, John E. C.; and Bunce, Roger A., 4,879,097, Cl. 422-67.000.

Burch, Kenneth R.; and Rivas, Mario A., to Motorola, Inc. Timer architecture for multi-task computers and for serial data decoding. 4,879,733, Cl. 377-44.000.

Burgess, Paul K.: *See—*
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Burke, Edmund T.; Dawdy, Daniel H.; and Rubert, Timothy M., to American Telephone and Telegraph Company; and AT&T Information Systems Inc. PBX and adjunct using multi-frequency tones for communication therebetween. 4,879,743, Cl. 379-142.000.

Burkel, Rainer; Engelsdorf, Kurt; Gawlik, Rolf; and Hagele, Karl-Heinz, to Robert Bosch GmbH. Device for actuating butterfly throttle valve of an internal combustion engine. 4,878,470, Cl. 123-401.000.

Burlington Industries, Inc.: *See—*
Russell, Ernest J.; and FitzGerald, Tanya E., 4,878,920, Cl. 8-476.000.

Burn, Ian, to Du Pont de Nemours, E. I., and Company. Low Dielectric constant compositions. 4,879,261, Cl. 501-32.000.

Burroughs Wellcome co.: *See—*
Daluge, Susan M.; and Leighton, Harry J., 4,879,296, Cl. 514-263.000.

Busboom, Garry W.; and Rogge, Gary L., to Exmark Manufacturing Company, Incorporated. Steering sulky for towing vehicles. 4,878,681, Cl. 280-32.700.

Buschmann, Gerd: *See—*
Schoen, Uwe; Kehrbach, Wolfgang; Hachmeister, Bernd; Buschmann, Gerd; and Kuehl, Ulrich G., 4,879,299, Cl. 514-286.000.

Buser, Hansjorg; and Morand, Adolf, to Ciba-Geigy AG. Process for the preparation of a solid adduct of sulfuric acid and urea. 4,879,413, Cl. 564-63.000.

Butcher, Ian; Carrick, Gordon S.; and Hillman, Kevin P., to Thomas J. Lipton Inc. Apparatus for preparation of confection products. 4,878,425, Cl. 99-450.200.

Butler Manufacturing Company: *See—*
Domigan, Charles N., 4,879,435, Cl. 174-48.000.

Butterworth, Lynda M.: *See—*
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Butterworth, Nathan I.; and Butterworth, Lynda M. Self-verifying transaction cards. 4,879,455, Cl. 235-280.000.

Butz, Ralph A.: *See—*
Boughton, John H.; Butz, Ralph A.; Cheng, Herman C. T.; Dennis, Jonathan R.; Hannon, Brian T.; and Weigel, Janet H., 4,879,043, Cl. 210-651.000.

Buysch, Hans-Josef: *See—*
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Bye, Richard L.: *See—*
Adam, Colin M.; Bye, Richard L.; Das, Santosh K.; and Skinner, David J., 4,878,967, Cl. 148-437.000.
Adam, Colin M.; Bye, Richard L.; Das, Santosh K.; and Skinner, David J., 4,879,095, Cl. 420-548.000.

Byrne, Erin K.: *See—*
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C. A. Weidmuller GmbH: *See—*
Haller, Bernd; Herkner, Ernst; Murray, Peter; Riesenberg, Volker; Schnatwinkel, Michael; Schulze, Rainer; Wagner, Georg; and Wilmes, Manfred, 4,878,859, Cl. 439-716.000.

C.F. Spiess & Sohn GmbH & Co.: *See—*
Spiess, Wolfram; and Himmelreich, Rolf, 4,879,071, Cl. 562-882.000.

C. R. Bard, Inc.: *See—*
Sinofsky, Edward L.; Spears, J. Richard; Dickinson, Douglas W.; and Wagner, Maria S., 4,878,492, Cl. 128-303.100.

Cabot Corporation: *See—*
List, Steven J.; and Hurst, Ronald C., 4,879,104, Cl. 423-450.000.

Cadiergue, Joseph: *See—*
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Calderhead, David: *See—*
Weng, Litai; Calderhead, David; Khanna, Pyare; and Ullman, Edwin F., 4,879,215, Cl. 435-7.000.

Calderone, Nicholas: *See—*
Mookherjee, Braja D.; Trenkle, Robert W.; Calderone, Nicholas; and Sands, Keith P., 4,879,271, Cl. 512-20.000.

California Fresno Transportation, Inc.: *See—*
Ruschhaupt, Dolph W., Jr., 4,878,598, Cl. 222-1.000.

Callaghan, Francis J.; and Vollmann, William, to Telectronics N.V. Pacemaker with improved automatic output regulation. 4,878,497, Cl. 128-419.0PG.

Callaway, James J. Intravenous needle and holder assembly. 4,878,904, Cl. 604-273.000.

Cameco Industries, Inc.: *See—*
Giardina, Jacob; and Rodrigue, Kenneth, 4,878,341, Cl. 56-364.000.

Cameron, Harold A.: *See—*
Sutter, Leroy V.; and Cameron, Harold A., 4,878,894, Cl. 604-24.000.

Campagnolo S.p.A.: *See—*
Romano, Antonio, 4,878,395, Cl. 74-531.000.
Romano, Antonio, 4,878,884, Cl. 474-82.000.

Campanelli, Michael R., to Xerox Corporation. Method of fabricating thermal ink jet printheads. 4,878,992, Cl. 156-633.000.

Canada, Her Majesty the Queen in Right of: *See—*
Inkol, Robert J., 4,879,561, Cl. 342-195.000.

Cann, Roger S., to Behr Industrial Equipment Inc. Electrostatic painting apparatus having optically sensed flow meter. 4,878,454, Cl. 118-663.000.

Cannon, Donald M., to GTE Products Corporation. Lamp base. 4,878,854, Cl. 439-236.000.

Cano, David L. Buoyant fishing container. 4,878,311, Cl. 43-54.100.

Canon Kabushiki Kaisha: *See—*
Hanabusa, Tadashi, 4,879,566, Cl. 346-76.0PH.
Hanyu, Yukio; and Futami, Yukiko, 4,879,059, Cl. 252-299.400.
Honjo, Takeshi; and Yoshida, Akimaro, 4,878,656, Cl. 270-53.000.
Inaba, Yutaka; and Taniguchi, Osamu, 4,878,740, Cl. 350-337.000.
Ise, Makoto; and Okino, Tadashi, 4,879,600, Cl. 358-213.190.
Kozuki, Susumu; Takahashi, Koji; Satoh, Keiji; Nagasawa, Kenichi; Edakubo, Hiroo; and Otokawa, Mitsuhiro, 4,879,609, Cl. 360-66.000.
Nakura, Yoshiyuki; and Kato, Yasuo, 4,879,144, Cl. 428-1.000.
Ohkubo, Yukitoshi; Watanabe, Yasuyuki; Mochizuki, Chiori; Ishii, Takayuki; Yamanobe, Masato; and Ishiwata, Kazuya, 4,878,742, Cl. 350-347.00V.
Onuki, Kazuhiko; Maetani, Masami; Ito, Masahiko; and Murata, Shinji, 4,879,572, Cl. 355-45.000.
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Sugawa, Shigetoshi; Nakamura, Yoshio; Tanaka, Nobuyoshi; and Ueno, Isamu, 4,879,470, Cl. 250-578.000.
Takei, Masahiro, 4,879,591, Cl. 358-29.00C.

Cantrell, Cyrus D.: *See—*
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Capitol Records, Inc.: *See—*
Hilbert, Robert S.; and Korniski, Ronald J., 4,878,744, Cl. 350-447.000.

Carbo Ceramics Inc.: *See—*
Fitzgibbon, Jeremiah J., 4,879,181, Cl. 428-402.000.

Carboxyque Francaise: *See—*
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Cardiff, Christopher H.: *See—*
Jacanin, James M., Jr.; and Cardiff, Christopher H., 4,878,704, Cl. 294-54.500.

Carithers, Charles H., Jr. Circular mat cutting apparatus. 4,878,409, Cl. 83-466.000.

Carl Freudenberg, Firma: *See—*
Halder, Hans-Joerg, 4,878,767, Cl. 384-140.000.

Carl Hurth Maschinen - und Zahnradfabrik GmbH & Co.: *See—*
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Carl-Zeiss-Stiftung: *See—*
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Carlsen, James A.: *See—*
Regan, James B.; Ikovich, George J.; Carlsen, James A.; Juelich, Richard J.; and Kogel, Henry G., 4,878,452, Cl. 114-293.000.

Carlucci, Vito; and Kunz, Raymond, to Clairol Incorporated. Waterproof switch assembly for electrical appliances. 4,879,443, Cl. 200-293.100.

Carminati, Antonio; and Perillo, Andrea, to Snamprogetti S.p.A. Method for cooling gases and/or vapors from non-ferrous metal treatment plants, and the relative apparatus. 4,878,654, Cl. 266-159.000.

Carolus, Thomas: *See—*
Rubig, Heinz; and Carolus, Thomas, 4,878,420, Cl. 98-2.080.

Caron, Bernard G.; Gutterman, Pamela R.; and Murray, Dale D., to AMP Incorporated. Fiber optic connector including ferrule with filter isolator. 4,878,731, Cl. 350-96.210.

Carri-Med Ltd.: *See—*
Deer, John J., 4,878,379, Cl. 73-60.000.

Carrick, Gordon S.: *See—*
Butcher, Ian; Carrick, Gordon S.; and Hillman, Kevin P., 4,878,425, Cl. 99-450.200.

Carrier Corporation: *See—*
Otto, Nancy M., 4,878,837, Cl. 431-328.000.
Shaw, David N., 4,878,818, Cl. 417-308.000.

Carroll, William M., to Koller Manufacturing Corporation. Magnetic tape cassettes. 4,878,632, Cl. 242-199.000.

Carstensen, Kenneth J. Method of assembling coupling to tubing or casting. 4,878,285, Cl. 29-451.000.

Carver, Donnie R. Portable console and arm rest apparatus. 4,878,438, Cl. 108-44.000.

Casciani, Robert V.: *See—*
Latella, Anthony; and Casciani, Robert V., 4,879,399, Cl. 558-34.000.

Case, Paul D.; and Dittrich, David J., to British-American Tobacco Company, Ltd. Smoking articles. 4,878,507, Cl. 131-336.000.

Casey, Susan D. Modular energy saving covering. 4,878,258, Cl. 5-420.000.

Castel, Yvon, to Institut Francais du Petrole. Method and device for the remote positioning of an elbow coupling. 4,878,694, Cl. 285-24.000.

Castleman, Lawrence D. Foldable intraocular disc lens. 4,878,912, Cl. 623-6.000.

Caterpillar Industrial Inc.: *See—*
Baumgartner, Kenneth A.; and Pickering, William, 4,879,623, Cl. 361-33.000.

Catsimpoolas, Nicholas; Kamarei, Ahmad R.; Griffith, Ann L.; and Sinn, Robert S., to Angio-Medical Corporation. Lipids from omentum and methods for cosmetic use. 4,879,114, Cl. 424-95.000.

Cawley, Scott A.; and Vidler, Malcolm E., to Thiess Contractors Pty. Ltd. Waste bin lid. 4,878,596, Cl. 220-331.000.

CBI Research Corporation: *See—*
Pawski, Rolf P., 4,878,329, Cl. 52-245.000.

Central Glass Company, Limited: *See—*
Furuuchi, Toshiharu, 4,879,159, Cl. 428-161.000.

Century Electric, Inc.: *See—*
Barahia, Manoj M., 4,879,483, Cl. 310-63.000.

Ceramatec, Inc.: *See—*
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Cerny, Mark S.: *See—*
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Cerretti, Douglas P.; Davis, Brian S.; and Maliszewski, Charles R., to Immunex Corporation. Bovine interleukin-1β DNA sequence. 4,879,374, Cl. 536-27.000.

Ceske Vysoke Uceni Technicke: *See*—
Pavlansky, Rudolf; and Petrtyl, Miroslav, 4,878,919, Cl. 623-23.000.

Cetus Corporation: *See*—
Chong, Kong-Teck, 4,879,111, Cl. 424-85.200.

Chakravarty, Abhijit J. M.; Gangsaas, Dagfinn; and Moore, John B., to Boeing Company, The. Decentralized cautious adaptive control system. 4,879,643, Cl. 364-148.000.

Chaldar, Inc.: *See*—
Johnson, John W., 4,878,676, Cl. 277-24.000.

Chamberlin, Davis W.; Leonard, Vurnen J.; and Koizumi, Osamu, to Minnesota Mining and Manufacturing Company; and Sony Corporation. Disk restraint. 4,879,621, Cl. 360-133.000.

Chamla, Claude; and Speakman, John G., to BP Chemicals Limited. Process for polymerising ethylene using a chromium oxide catalyst. 4,879,359, Cl. 526-105.000.

Champane, Dean J. Motor vehicle sunshield. 4,878,708, Cl. 296-97.700.

Champion Spark Plug: *See*—
Manning, William R., 4,879,260, Cl. 501-32.000.

Chan, Eric Y., to Boeing Company, The. Method of making a monolithic interleaved LED/PIN photodetector array. 4,879,250, Cl. 437-3.000.

Chang, Byung J., to Kaiser Optical System, Inc. Real time holographic filter using nonlinear optical materials. 4,879,167, Cl. 428-215.000.

Chang, Laurence W.: *See*—
Singh, Balwant; Chang, Laurence W.; and Henderson, William A., Jr., 4,879,410, Cl. 560-344.000.

Charles Stark Draper Laboratory, Inc., The: *See*—
Dawson, Thomas F.; and Ewing, Paul C., 4,878,315, Cl. 51-165.00R.

Charney, William, to Schering Corporation. Novel *Aspergillus niveus* microorganism used for the chiral reduction of carbonyl groups. 4,879,233, Cl. 435-254.000.

Chatterjee, Ananda M., to Shell Oil Company. In-reactor stabilization of polyolefins via coated stabilizers. 4,879,141, Cl. 427-213.000.

Cheemalavagu, Suresh: *See*—
Ramesh, Nallepilli S.; Cheemalavagu, Suresh; and Erikson, Anders, 4,879,727, Cl. 375-76.000.

Chen, Bo-Zhou. Self-retractable rubber nipple. 4,878,496, Cl. 128-360.000.

Chen, Wenpeng: *See*—
Frazier, Claude C.; Guha, Shekhar; and Chen, Wenpeng, 4,879,479, Cl. 307-425.000.

Chen, Yen-rong; Yang, Ming-he; Huang, Liang; Liu, Geng-tao; and Benz, Ulrich, to Chinese Academy of Medical Sciences; and Bayer Aktiengesellschaft. Delta-butyrolactams, thereof, processes for the preparation thereof and their medical use. 4,879,390, Cl. 548-453.000.

Chen, Ying C.; Liu, Jia-ming; and Newkirk, Michael A., to GTE Laboratories Incorporated. Optically controlled semiconductor waveguide interferometer apparatus. 4,878,723, Cl. 350-96.140.

Cheng, Herman C. T.: *See*—
Boughton, John H.; Butz, Ralph A.; Cheng, Herman C. T.; Dennis, Jonathan R.; Hannon, Brian T.; and Weigel, Janet H., 4,879,043, Cl. 210-651.000.

Cheng, Tai C.: *See*—
Mercer, Frank W.; Froix, Michael F.; and Cheng, Tai C., 4,879,338, Cl. 524-508.000.

Chern, Lu-Meng. Exercise machine weight guide. 4,878,662, Cl. 272-118.000.

Cherne Medical, Inc.: *See*—
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Cherry, Craig D.; Taussig, Andrew P.; and Brooks, Michael T., to Spectra-Physics, Inc. Method of decoding a binary scan signal. 4,879,456, Cl. 235-462.000.

Chervonenko, Alfred G.; Naduty, Vladimir P.; Morus, Vladimir L.; Kravchenko, Valery I.; and Lavrukhin, Viktor A., to Institut Geotekhnicheskoj Mekhaniki. Elastomeric element for forming surfaces engageable with loose abrasive materials, and a sizing screen made from such elements. 4,879,024, Cl. 209-352.000.

Chiarino, Dario; Della Bella, Davide; Jommi, Giancarlo; Badone, Domenico; Pagliarin, Roberto; and Tavecchia, Paolo. Process for the preparaiton of alkyl fluorides. 4,879,068, Cl. 260-397.000.

Chin, Albert K., to Fogarty, Thomas J. Angioscope with flush solution deflector shield. 4,878,893, Cl. 604-21.000.

Chinese Academy of Medical Sciences: *See*—
Chen, Yen-rong; Yang, Ming-he; Huang, Liang; Liu, Geng-tao; and Benz, Ulrich, 4,879,390, Cl. 548-453.000.

Chong, Kong-Teck, to Cetus Corporation. Treatment of infections with lymphokines. 4,879,111, Cl. 424-85.200.

Christensen, Jon B., to Halliburton Company. Perforate, test and sample tool and method of use. 4,878,538, Cl. 166-264.000.

Chu, Fun S.; Wei, Ru-Dong; and Zhang, Guang S., to Wisconsin Alumni Research Foundation. Assay for trichothecenes. 4,879,248, Cl. 436-543.000.

Chuang, Jo-Yu, to Sandvik Rock Tools, Inc. Pilot-valve-controlled percussion drilling tool. 4,878,550, Cl. 175-296.000.

Chugai Seiyaku Kabushiki Kaisha: *See*—
Shimoda, Naoto; and Kawaguchi, Tsutomu, 4,879,272, Cl. 514-8.000.

Chung, Jackson. Combination accessory drive and speed reducer. 4,878,401, Cl. 74-781.00R.

Ciba-Geigy AG: *See*—
Buser, Hansjorg; and Morand, Adolf, 4,879,413, Cl. 564-63.000.
Furholz, Urs J., 4,879,203, Cl. 430-378.000.

Ciba-Geigy Corporation: *See*—
Albrecht, Bernhard; and Beyrich, Jurgen, 4,879,415, Cl. 564-412.000.
Tieke, Bernd, 4,879,350, Cl. 525-332.100.

Cincinnati Electronics Corporation: *See*—
Geile, Michael; Dapper, Mark; and Hill, Terrance, 4,879,527, Cl. 331-1.00A.

Citizen Watch Co., Ltd.: *See*—
Kihara, Hiroyuki; and Mitaki, Kazuya, 4,879,669, Cl. 364-550.000.

Claerbaut, Kevin R.: *See*—
Rosenthal, Bruce C.; Zill, Kevin L.; Claerbaut, Kevin R.; Berglund, David M.; and Grover, Kenneth L., 4,878,524, Cl. 144-356.000.

Clairol Incorporated: *See*—
Carlucci, Vito; and Kunz, Raymond, 4,879,443, Cl. 200-293.100.

Clarion Co., Ltd.: *See*—
Sugai, Kazuyoshi; Sato, Kiyotaka; and Nishizato, Hiroshi, 4,879,487, Cl. 310-313.00A.

Clark, Alan C.; Richards, Edward P.; and Shaw, Douglas R., to Lubrizol Corporation, The. Ore flotation process and use of mixed hydrocarbyl dithiophosphoric acids and salts thereof. 4,879,022, Cl. 209-166.000.

Clark, Bryan K., to Tandy Corporation. Dye-polymer optical data storage media with improved recording sensitivity. 4,879,709, Cl. 369-284.000.

Clark, John H.: *See*—
Dixon, George J.; Anthon, Douglas W.; and Clark, John H., 4,879,722, Cl. 372-21.000.
Dixon, George J.; Anthon, Douglas W.; and Clark, John H., 4,879,723, Cl. 372-21.000.

Clark, Ronald L.: *See*—
Prince, Paul R.; Ford, Michael G.; Schoendorfer, Donald W.; and Clark, Ronald L., 4,879,040, Cl. 210-637.000.

Clark, Russell L.; Van Order, Kim L.; Suman, Michael J.; and Zandbergen, Todd A., to Prince Corporation. Light control circuit for vanity mirror assembly. 4,879,637, Cl. 362-141.000.

Clark, Steven C.; and Wong, Gordon G., to Genetics Institute, Inc. Production of a recombinant human colony stimulating factor. 4,879,227, Cl. 435-70.000.

Clemmer Industries Limited: *See*—
Meyers, Arnold G., 4,878,707, Cl. 296-91.000.

Cline, Harvey E.; Ludke, Siegwalt; and Lorensen, William E., to General Electric Company. Method of displaying internal surfaces of three-dimensional medical images. 4,879,668, Cl. 364-522.000.

Coal Industry (Patents) Limited: *See*—
Meadows, Alan, 4,879,695, Cl. 367-25.000.

Cochran, Nancy P.; and Byrnes, Susan, to Cochran, Nancy P. Search system which continuously displays search terms during scrolling and selections of individually displayed data sets. 4,879,648, Cl. 364-300.000.

Cockshott, Ian D.: *See*—
Martin, Graham E.; Cockshott, Ian D.; and Fildes, Francis J. T., 4,878,908, Cl. 623-1.000.

Codding, Elias H., to Delta Technology Corporation. Multi-channel bichromatic product sorter. 4,878,582, Cl. 209-580.000.

Coffen, David L.; Schmid, Rudolf; and Sebastian, Mark J., to Hoffmann-La Roche Inc. Vitamin E intermediate. 4,879,395, Cl. 549-408.000.

Colarelli, Nicholas J., III, to Hunter Engineering Company. Vehicle wheel alignment transducer, system and method. 4,879,670, Cl. 364-559.000.

Collard, Jean-Noel: *See*—
McDonald, Ian A.; Palfreyman, Michael G.; and Collard, Jean-Noel, 4,879,305, Cl. 514-419.000.

Collier, Charles P., to Fluorographic Services, Inc. Method for color and black and white reproduction and formulation used therewith. 4,879,267, Cl. 503-201.000.

Collins, Robert T.; Quinn, John D.; and Fidrych, Stephen A., to Digital Equipment Corporation. Mounting chassis for a graphics function control unit. 4,879,635, Cl. 361-391.000.

Collomb, Jean: *See*—
Rhenter, Jean-Luc; and Collomb, Jean, 4,878,916, Cl. 623-18.000.

Combustion Engineering, Inc.: *See*—
Garde, Anand M., 4,879,093, Cl. 420-422.000.
Perrotti, Patrick A.; Joffre, Paul F.; Karoutas, Zeses E.; Corsetti, Lawrence V.; Bryan, William J.; and Hatfield, Stephen C., 4,879,090, Cl. 376-462.000.
Sublette, Kerry L.; Woolsey, Maron E.; Manning, Francis S.; Montgomery, Anne D.; and McInerney, Michael J., 4,879,240, Cl. 435-252.100.

Commercial Shearing, Inc.: *See*—
Haner, Lambert, 4,879,501, Cl. 318-645.000.

Comolli, Alfred G.: *See*—
Hippo, Edwin J.; Comolli, Alfred G.; and O'Brien, Robert, 4,879,021, Cl. 208-413.000.

Compagnie Europeenne du Zirconium Cezus: *See*—
Alheritiere, Edouard; and Prandi, Bernard, 4,878,966, Cl. 148-421.000.
Dubertret, Alain; and Prandi, Bernard, 4,878,954, Cl. 148-11.50F.

Compex Co., Ltd.: *See*—
Shimizu, Michitaka, 4,878,312, Cl. 47-1.100.

Connelly, Bruce A.; Wehrle, Matthew E.; and Greigger, Paul P., to PPG Industries, Inc. Fluoropolymer based coating composition for adhesion direct to glass. 4,879,345, Cl. 525-104.000.

Connery, James G.; and Shaffer, Earl W., Jr., to General Signal Corporation. Temperature compensation for potentiometrically operated ISFETS. 4,879,517, Cl. 324-438.000.

Connor, Linda A.: *See—*
Radwanski, Fred R.; Trimble, Lloyd E.; Smith, Roland C.; and Connor, Linda A., 4,879,170, Cl. 428-233.000.

Consolidated Rail Corporation: *See—*
Myers, Larry F.; Tharp, Douglas B.; and Holl, Ralph H., 4,878,437, Cl. 105-451.000.

Constant, Odile: *See—*
Vinot, Bernard; and Constant, Odile, 4,878,711, Cl. 299-9.000.

Constructions Industrielles de la Mediterranee: *See—*
Orquera, Henri; and Jennequin, Gerard, 4,878,416, Cl. 89-1.810.

Conti, Marisa: *See—*
Giorgi, Raffaello; Conti, Marisa; and Pifferi, Giorgio, 4,879,311, Cl. 514-533.000.

Continental Can Company, Inc.: *See—*
Newman, Frederick C.; and Marsella, Louis J., 4,879,147, Cl. 428-35.000.

Continental Plastic Containers, Inc.: *See—*
Blomquist, Leonard A., 4,878,823, Cl. 425-116.000.

Control Data Canada Limited: *See—*
Maki, Melvin C.; and Feller, Walter J., 4,879,544, Cl. 340-552.000.

Control Data Corporation: *See—*
Pombrio, Philip R., Jr., 4,879,672, Cl. 364-566.000.

Cooper, Herbert E.; de Fazekas, Josef P.; and Smith, E. Dallas, to DBX Corporation. Trailer suspension apparatus. 4,878,691, Cl. 280-189.000.

Cooper Industries, Inc.: *See—*
Hamm, Sidney R.; and Wainio, Ronald A., 4,879,441, Cl. 200-144.00B.

Coppa, Anthony P., to General Electric Company. Truss structure and method for construction thereof. 4,878,286, Cl. 29-467.000.

Cordes, Arno; Kula, Maria-Regina; Kroner, Karl-Heinz; and Stach, Wolfgang, to Gesellschaft fur Biotechnologische Forschung mbH (GBF). Process for the purification and recovery of formate-dehydrogenase (FDH) from *Candida boidinii,* and FDH-containing product. 4,879,234, Cl. 435-189.000.

Cordes, Fred G.: *See—*
Liu, Yuan K.; Kuhmichel, Philip A.; Cordes, Fred G.; and Wong, Wayman, 4,879,127, Cl. 426-325.000.

Cordova, David S.; Rowan, Hugh H.; and Young, John A., to Allied-Signal Inc. Organic reinforcing fibers with bundle separation during fiber cutting. 4,879,179, Cl. 428-361.000.

Cornell Research Foundation, Inc.: *See—*
Meister, Alton, 4,879,370, Cl. 530-331.000.
Theopold, Klaus H.; and Byrne, Erin K., 4,879,397, Cl. 556-11.000.

Cornils, Boy: *See—*
Bach, Hanswilhelm; Bahrmann, Helmut; Cornils, Boy; Gick, Wilhelm; Heim, Volker; Konkol, Werner; and Wiebus, Ernst, 4,879,418, Cl. 568-454.000.

Corsetti, Lawrence V.: *See—*
Perrotti, Patrick A.; Joffre, Paul F.; Karoutas, Zeses E.; Corsetti, Lawrence V.; Bryan, William J.; and Hatfield, Stephen C., 4,879,090, Cl. 376-462.000.

Cotreau, Gerald M., to Harris Corporation. High accuracy current source and high accuracy transconductance stage. 4,879,520, Cl. 330-257.000.

Cotreau, Gerald M., to Harris Corporation. High accuracy, high impedance differential to single-ended current converter. 4,879,523, Cl. 330-288.000.

Cotswold Architectural Products Limited: *See—*
Wronski, Yurek A., 4,878,699, Cl. 292-143.000.

Cox, David H.: *See—*
Watkins, James D.; Andreas, David W.; and Cox, David H., 4,878,765, Cl. 383-116.000.

Cox, Robert W. Locking device for a vehicle wheel and tire. 4,878,366, Cl. 70-14.000.

Cregg, James M.: *See—*
Stroman, David W.; Cregg, James M.; Harpold, Michael M.; and Sperl, George T., 4,879,231, Cl. 435-172.300.

Cristoni, Aldo: *See—*
Foresta, Piero; Ghirardi, Orlando; Gabetta, Bruno; and Cristoni, Aldo, 4,879,376, Cl. 536-18.100.

Cristos, Juan: *See—*
Romero Lledo, Antonio; Diaz Zorita, Fernando; and Cristos, Juan, 4,878,577, Cl. 198-803.900.

Critkon, Inc.: *See—*
Edelman, Howard; and Ritson, Carl, 4,878,646, Cl. 251-9.000.

Crompton, Geoffrey. Fire retardant additives and their uses. 4,879,066, Cl. 252-606.000.

Cronin, Dennis C., to Beloit Corporation. Twin wire former with roll press followed by extended nip press. 4,879,001, Cl. 162-206.000.

Crosfield Electronics Limited: *See—*
Stansfield, Peter W.; and Reed, Alastair, 4,879,594, Cl. 358-80.000.

Cross, Debra A.: *See—*
Klesius, Phillip H.; and Cross, Debra A., 4,878,895, Cl. 604-49.000.

Cross, Malcolm G.: *See—*
Neaves, Bryan D.; Hill, Frederick W. L.; and Cross, Malcolm G., 4,879,148, Cl. 428-40.000.

Crystaloid Electronics Co.: *See—*
Ferrato, Joseph P.; and Ferrato, Julie C., 4,879,061, Cl. 252-299.620.

CSK Corporation: *See—*
Suzuki, Hidefumi, 4,879,691, Cl. 365-215.000.

Cubides, Wilson J., to Art Materials Service, Inc. Easel hinge. 4,878,266, Cl. 16-225.000.

Cullis-Hill, David. Preparation of hyaluronic acid from synovial fluid. 4,879,375, Cl. 536-55.100.

Cunkle, Glen T.: *See—*
Willer, Rodney L.; Cunkle, Glen T.; and Klein, Nathan, 4,878,968, Cl. 149-45.000.

Cunningham, Donald J., to Morton Thiokol, Inc. Light weight vehicle restraint bag inflator. 4,878,690, Cl. 280-741.000.

Cunningham, Donald M., to Emerson Electric Co. Self-regulating baseboard heater and system. 4,879,453, Cl. 219-213.000.

Cuomo, Andrea: *See—*
Rossi, Domenico; and Cuomo, Andrea, 4,879,641, Cl. 363-98.000.

Cupp, Carl J., to Pachmayr Ltd. Gun grip. 4,878,304, Cl. 42-71.020.

Custode, Frank Z., to Rockwell International Corporation. Diffused field CMOS-bulk process and CMOS transistors. 4,879,583, Cl. 357-42.000.

Cutler, Winnifred B.; Preti, George; and Huggins, George R., to Monell Chemical Senses Center; and University of Pennsylvania. Birth control method involving monitoring of axillary androstenol and dehydroepiandrosterone. 4,879,244, Cl. 436-65.000.

Cypress Semiconductor Corporation: *See—*
Pathak, Jagdish; Douglass, Stephen M.; and Vider, Dov-Ami, 4,879,481, Cl. 307-465.000.

Czaja, Julius. Atmospheric latent heat engine. 4,878,349, Cl. 60-674.000.

Dae Ryung Vacumm Co. Ltd.: *See—*
Lee, Hee-Yong, 4,879,017, Cl. 204-298.000.

Daes, Guido F.: *See—*
Van Biesen, Jozef A.; Daes, Guido F.; and Verstringe, Jan B., 4,879,196, Cl. 430-100.000.

Daggett, Pierre-Marc; and Simione, Frank P., to American Type Culture Collection. Method of culturing freeze-dried microorganisms and resultant preparation. 4,879,239, Cl. 435-252.100.

Dahlquist, John A., to Measurex Corporation. Rapid-scanning infrared sensor. 4,879,471, Cl. 250-359.100.

Daicel Chemical Industries, Ltd.: *See—*
Namikoshi, Hajime; Shibata, Tohru; and Okamoto, Ichiro, 4,879,038, Cl. 210-635.000.
Ohtake, Etsuo; Yamaki, Kaoru; and Kuroda, Takayuki, 4,878,973, Cl. 156-85.000.

Dainichiseika Color & Chemicals Mfg. Co. Ltd.: *See—*
Saito, Nobuo; and Noda, Mitsuo, 4,879,332, Cl. 524-436.000.

Dainippon Ink and Chemicals, Inc.: *See—*
Tabayashi, Isao; Harada, Hiroshi; Inoue, Sadahiro; and Fukutomi, Hiroshi, 4,878,946, Cl. 106-27.000.

Dainippon Screen Mfg. Co., Ltd.: *See—*
Endo, Kenji; Nagata, Shinichi; and Uemura, Haruo, 4,878,745, Cl. 350-469.000.

Daiso Co., Ltd.: *See—*
Fujio, Yoshiharu; Matsukuma, Kanemasa; and Nishimoto, Toshihiko, 4,879,363, Cl. 526-314.000.

Daito, Hiroshi: *See—*
Iida, Muneo; Honda, Masanobu; Kawamura, Katsumi; Daito, Hiroshi; Miyake, Yoshihiko; Setone, Shouichi; Takahashi, Hatsuo; and Nakanishi, Michihiro, 4,879,618, Cl. 360-106.000.

Dallago, Raymond P.: *See—*
Johnson, Grannis S.; Grinstein, Reuben H.; Hartman, Stuart J.; and Dallago, Raymond P., 4,879,414, Cl. 564-388.000.

Dally, Ellen L.: *See—*
Mays, Thomas D.; and Dally, Ellen L., 4,879,228, Cl. 435-101.000.

Daluge, Susan M.; and Leighton, Harry J., to Burroughs Wellcome co. Xanthine derivatives. 4,879,296, Cl. 514-263.000.

Daly, Michael F.: *See—*
Grimstad, Ronald N.; and Daly, Michael F., 4,878,255, Cl. 4-236.000.

Daly, Paul D.; Brooks, Mark A.; Fallis, Robert E.; and Cerny, Mark S., to Allied-Signal Inc. Armature with shear stress damper. 4,878,650, Cl. 251-129.150.

Dana Corporation: *See—*
Zlotek, Thaddeus F., 4,878,570, Cl. 192-45.000.

Danby, Clive M.: *See—*
Jones, Gregory D.; Owens, William R.; Thiel, Clifford G.; and Danby, Clive M., 4,879,624, Cl. 361-65.000.

Danesi, Pier R.: *See—*
Alexandratos, Spiro D.; Danesi, Pier R.; and Horwitz, E. Philip, 4,879,316, Cl. 521-27.000.

Dankowski, Manfred; Lieser, Thomas; Prescher, Gunter; Leonhardt, Wolfgang; and Diehl, Manfred, to Degussa Aktiengesellschaft. Aqueous bleaching agent suspensions containing peroxycarboxylic acid, method for their preparation and use. 4,879,057, Cl. 252-99.000.

Dapper, Mark: *See—*
Geile, Michael; Dapper, Mark; and Hill, Terrance, 4,879,527, Cl. 331-1.00A.

Darcy, John J.: *See—*
Thomsen, Karl V.; Darcy, John J.; Griswold, Augustus W.; Haritonoff, Boris W.; and Pond, Jacob, 4,878,985, Cl. 156-459.000.

Dard, Pierre; and Maes, Fabrice, to La Telemecanique Electrique. Manually controlled switching apparatus. 4,879,437, Cl. 200-1.00R.

Darling, Roy D.: *See—*
Turner, John E.; Rutledge, David L.; and Darling, Roy D., 4,879,688, Cl. 365-201.000.

Darnell, Hoyt C. Paper roll splitter. 4,878,410, Cl. 83-635.000.

Das, Pawan K. ROM driven PWM inverter. 4,879,640, Cl. 363-41.000.

Das, Santosh K.: *See—*
Adam, Colin M.; Bye, Richard L.; Das, Santosh K.; and Skinner, David J., 4,878,967, Cl. 148-437.000.

Adam, Colin M.; Bye, Richard L.; Das, Santosh K.; and Skinner, David J., 4,879,095, Cl. 420-548.000.

Dasbach, Burkhard: *See—*
Assel, Eugen; Dasbach, Burkhard; and Gebhard, Bruno, 4,879,434, Cl. 174-35.00R.

Data Technology Corporation: *See—*
Freeze, Robin J.; and Grimsley, John L., 4,879,612, Cl. 360-78.060.

Dave McKee (SHeffield) Limited: *See—*
Wilson, Geoffrey; and Hemingway, Trevor, 4,878,373, Cl. 72-420.000.

Davidson Textron Inc.: *See—*
Muller, John, 4,878,827, Cl. 425-434.000.

Davies, David H., executor: *See—*
Bennet, Andrew H., deceased, 4,878,549, Cl. 175-248.000.

Davies, Theodore E.: *See—*
Watson, James E.; and Davies, Theodore E., 4,878,480, Cl. 126-91.00A.

Davis, Brian S.: *See—*
Cerretti, Douglas P.; Davis, Brian S.; and Maliszewski, Charles R., 4,879,374, Cl. 536-27.000.

Davis, Cecil J.: *See—*
Jucha, Rhett B.; Davis, Cecil J.; Tang, Tom; and Loewenstein, Lee M., 4,878,994, Cl. 156-643.000.

Davis, Larry: *See—*
Effland, Richard C.; Davis, Larry; Kapples, Kevin J.; and Olsen, Gordon E., 4,879,382, Cl. 540-554.000.

Davison, Edward; and Wells, James I., to Pfizer Inc. Pharmaceutically acceptable salts. 4,879,303, Cl. 514-356.000.

Dawdy, Daniel H.: *See—*
Burke, Edmund T.; Dawdy, Daniel H.; and Rubert, Timothy M., 4,879,743, Cl. 379-142.000.

Dawson, Thomas F.; and Ewing, Paul C., to Charles Stark Draper Laboratory, Inc., The. Griding guide and method. 4,878,315, Cl. 51-165.00R.

DBX Corporation: *See—*
Cooper, Herbert E.; de Fazekas, Josef P.; and Smith, E. Dallas, 4,878,691, Cl. 280-189.000.

DD-Dynamic Devices Ltd.: *See—*
Stache, Knut, 4,879,030, Cl. 210-238.000.

De Bruyn, Marcel F. L.; Van Lommen, Guy R. E.; and Lutz, William R., to Janssen Pharmaceutica N.V. Herbicidal 1,5-substituted 1H-imidazoles. 4,878,940, Cl. 71-92.000.

Debus, Jurgen; and Lehr, Lothar, to Rittal-Werk. Socket for a control panel. 4,878,777, Cl. 403-205.000.

Dechelette, Helen M. P., to Molex Incorporated. Low profile shielded jack. 4,878,858, Cl. 439-607.000.

Dee, Robert J.: *See—*
Flemming, J. Peter; and Dee, Robert J., 4,878,601, Cl. 222-137.000.

Deer, John J., to Carri-Med Ltd. Rheometer. 4,878,379, Cl. 73-60.000.

Deere & Company: *See—*
Moon, Seaton; and Bergene, Mark A., 4,878,559, Cl. 180-244.000.

de Fazekas, Josef P.: *See—*
Cooper, Herbert E.; de Fazekas, Josef P.; and Smith, E. Dallas, 4,878,691, Cl. 280-189.000.

Deguchi, Tatsuya; and Mieno, Fumitake, to Fujitsu Limited. Method for fabricating bipolar-MOS devices. 4,879,255, Cl. 431-59.000.

Degussa Aktiengesellschaft: *See—*
Dankowski, Manfred; Lieser, Thomas; Prescher, Gunter; Leonhardt, Wolfgang; and Diehl, Manfred, 4,879,057, Cl. 252-99.000.

DeJong, Allan W., to Siemens-Bendix Automotive Electronics Limited. Heater control valve with flexible deflector. 4,878,514, Cl. 137-110.000.

Del Monte Corporation: *See—*
Liu, Yuan K.; Kuhmichel, Philip A.; Cordes, Fred G.; and Wong, Wayman, 4,879,127, Cl. 426-325.000.

Delatte, Daniel; and Simon, Bernard, to L'air Liquide, Societe Anonyme pour l'etude et l'exploitation des Procedes Georges Claude. Closing device for cryogenic container. 4,878,594, Cl. 220-254.000.

Delevallee, Francoise; and Potier, Pierre, to Roussel Uclaf. Novel method and composition. 4,879,298, Cl. 514-282.000.

Dell, Travis E. Portable unloading platform and ramp. 4,878,800, Cl. 414-401.000.

Della Bella, Davide: *See—*
Chiarino, Dario; Della Bella, Davide; Jommi, Giancarlo; Badone, Domenico; Pagliarin, Roberto; and Tavecchia, Paolo, 4,879,068, Cl. 260-397.000.

Deloy, Pierre: *See—*
Poisson, Pierre; Rivas, Nadine; and Deloy, Pierre, 4,879,327, Cl. 524-93.000.

Delphax Systems: *See—*
Kubelik, Igor, 4,879,569, Cl. 346-159.000.
Plasscheart, Paul E., 4,879,571, Cl. 355-26.000.

Delta Technology Corporation: *See—*
Codding, Elias H., 4,878,582, Cl. 209-580.000.

DeLuca, Michael J.; and Reed, Jeffrey B., to Motorola, Inc. Communication receiver system having a decoder operating at variable frequencies. 4,879,758, Cl. 455-296.000.

Demangeon, Francis; and Lopez, Emile, to ELF France. Cationic emulsions of bituminous binders of the type bitumen/polymer and cationic emulsifying system preferably utilizable for obtaining said emulsions. 4,879,326, Cl. 524-61.000.

De Mon, Bob; and Van Hoorn, Antonius I., to Hoogovens Groep B.V. Method of removal of polycyclic aromatic hydrocarbons from a liquid. 4,879,049, Cl. 210-777.000.

Demoute, Jean-Pierre: *See—*
Tessier, Jean; Demoute, Jean-Pierre; and Cadiergue, Joseph, 4,879,302, Cl. 514-351.000.

De Munck, Johannes W. J.; and Lohmeijer, Johannes H. G. M., to General Electric Company. Polymer mixture comprising a polyphenylene ether, a block copolymer, a phosphate ester and additives. 4,879,330, Cl. 524-151.000.

Demura, Makoto: *See—*
Asakura, Koichi; Demura, Makoto; and Matsumoto, Takenori, 4,879,660, Cl. 364-474.150.

de Muro, David M.; Stillmank, John G.; and Rabe, Duane C., to Motorola, Inc. Surface mount filter with integral transmission line connection. 4,879,533, Cl. 333-206.000.

Den Boef, Johannes H.: *See—*
Mehlkopf, Antoon F.; and Den Boef, Johannes H., 4,879,514, Cl. 324-309.000.

Denki Kagaku Kogyo Kabushiki Kaisha: *See—*
Mori, Yoshiharu; Yamada, Suzuya; Saito, Mitsuaki; Hagiwara, Hirotoshi; and Ehara, Kenichi, 4,878,866, Cl. 445-36.000.

Dennis, Jonathan R.: *See—*
Boughton, John H.; Butz, Ralph A.; Cheng, Herman C. T.; Dennis, Jonathan R.; Hannon, Brian T.; and Weigel, Janet H., 4,879,043, Cl. 210-651.000.

Dentsply G.m.b.H.: *See—*
Polz, M. H., 4,879,136, Cl. 427-2.000.

Deposition Sciences, Inc.: *See—*
Gray, Howard R.; Shimshock, Richard P.; and Krisl, Matthew E., 4,879,140, Cl. 427-38.000.

de Rahm, Olivier, to Nestec S.A. Preparation of whey products having reduced allergericity. 4,879,131, Cl. 426-583.000.

Derby, Norwin C., to Super Sack Manufacturing Corporation. Static controlled discharge spout. 4,878,600, Cl. 222-105.000.

Deutsche Rockwool Mineralwoll GmbH: *See—*
Pankatz, Manfred, 4,879,157, Cl. 428-157.000.

Deutsche Voest-Alpine Industrieanlagenbau GmbH: *See—*
Kepplinger, Werner, 4,878,943, Cl. 75-25.000.

Development Finance Corporation: *See—*
Brookes, David L., 4,878,664, Cl. 273-11.00R.

Dever, James A., to Green Ball Bearing Company. Unitary hub assembly. 4,878,683, Cl. 280-96.100.

Devon, Thomas J.: *See—*
Puckette, Thomas A.; Devon, Thomas J.; Phillips, Gerald W.; and Stavinoha, Jerome L., 4,879,416, Cl. 568-13.000.

Devtex: *See—*
Mirabel, Pierre; and Schoumacher, Marcel, 4,878,268, Cl. 19-258.000.

De Wames, Roger E.: *See—*
Marshall, David B.; De Wames, Roger E.; Morgan, Peter E. D.; and Ratto, Joseph J., 4,879,537, Cl. 335-216.000.

DeWilde, Johannes: *See—*
Sauerwald, Wilhelm A.; DeWilde, Johannes; Van Eerdewijk, Karel J. E.; Beenker, Franciscus P. M.; and Segers, Marinus T. M., 4,879,717, Cl. 371-22.300.

DeWitt, John W.: *See—*
Fox, Charles; DeWitt, John W.; and Rothenberger, John D., Jr., 4,879,116, Cl. 424-682.000.

Dial Corporation, The: *See—*
Wood-Rethwill, Julianne C.; Jaworski, Robert J.; Myers, E. Gary; and Marshall, Michael L., 4,879,063, Cl. 252-370.000.

Diamand, Felix, to Thomson-CSF. Transferred electron device with periodic ballistic regions. 4,879,581, Cl. 357-3.000.

Diamant Boart Cralius Ltd.: *See—*
Bennet, Andrew H., deceased, 4,878,549, Cl. 175-248.000.

Diaz-Silveira, Jorge. Barrier assembly for a parking space. 4,879,554, Cl. 340-932.200.

Diaz Zorita, Fernando: *See—*
Romero Lledo, Antonio; Diaz Zorita, Fernando; and Cristos, Juan, 4,878,577, Cl. 198-803.900.

DiBianca, Frank A., to University of North Carolina. Mixed media for kinestatic charge detectors. 4,879,469, Cl. 250-374.000.

Dickinson, Douglas W.: *See—*
Sinofsky, Edward L.; Spears, J. Richard; Dickinson, Douglas W.; and Wagner, Maria S., 4,878,492, Cl. 128-303.100.

Dideco S.p.A.: *See—*
Panzani, Ivo, 4,879,031, Cl. 210-360.200.

Diehl, Manfred: *See—*
Dankowski, Manfred; Lieser, Thomas; Prescher, Gunter; Leonhardt, Wolfgang; and Diehl, Manfred, 4,879,057, Cl. 252-99.000.

Diesel Kiki Co., Ltd.: *See—*
Fujii, Kazuo, 4,878,358, Cl. 62-227.000.
Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, 4,878,814, Cl. 417-63.000.

Dietz, Henry G. Breathing sensor. 4,878,502, Cl. 128-725.000.

Dietzen, Gary H. Method for accumulating and containing bore hole solids and recovering drill fluids and waste water on drilling rigs. 4,878,576, Cl. 198-494.000.

Diffendaffer, Paul: *See—*
Johansen, Laurie A.; and Diffendaffer, Paul, 4,878,748, Cl. 351-44.000.

Digital Equipment Corporation: *See—*
Collins, Robert T.; Quinn, John D.; and Fidrych, Stephen A., 4,879,635, Cl. 361-391.000.

Dilk, Mark A.: *See—*
Toutant, Roy T.; Perry, David S.; Brennan, Michael A.; Kreko, James E.; and Dilk, Mark A., 4,878,368, Cl. 72-9.000.

Dillner, James: *See*—
Anscher, Joseph A.; and Dillner, James, 4,878,269, Cl. 24-115.00G.
Dion, Donald D. Motorized mail cart. 4,878,554, Cl. 180-19.300.
Dismon, Peter: *See*—
Weidenhaupt, Wolfgang; Wepner, Gunther; Dismon, Peter; and Remijn, Mattheus G., 4,878,343, Cl. 57-222.000.
Dittrich, David J.: *See*—
Case, Paul D.; and Dittrich, David J., 4,878,507, Cl. 131-336.000.
Dixon, George J.; Anthon, Douglas W.; and Clark, John H., to Amoco Corporation. Generation of coherent optical radiation by optical mixing. 4,879,722, Cl. 372-21.000.
Dixon, George J.; Anthon, Douglas W.; and Clark, John H., to Amoco Corporation. Intracavity generation of coherent optical radiation of optical mixing. 4,879,723, Cl. 372-21.000.
Dobay, Laszlo : *See*—
Fischer, Janos; Dobay, Laszlo ; Major, Mihaly; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Hajos, Gyorgy; and Szporny, Laszlo , 4,879,404, Cl. 560-051.000.
Dobson, James B.: *See*—
Rondel, Stephen A.; and Dobson, James B., 4,878,701, Cl. 292-288.000.
Dr. Ing. h.c.f. Porsche Aktiengesellschaft: *See*—
Adamek, Jan; Schaich, Karl-Heinz; and Heck, Wolfgang, 4,879,015, Cl. 204-224.00R.
Dr. Johannes Heidenhain GmbH: *See*—
Gorski, Werner; and Huber, Josef, 4,879,667, Cl. 364-522.000.
Dr. Lo. Zambeletti S.p.A.: *See*—
Giordani, Antonio; and Vecchietti, Vittorio, 4,879,300, Cl. 514-317.000.
Dodd, John H.: *See*—
Schwender, Charles F.; and Dodd, John H., 4,879,384, Cl. 546-114.000.
Doi, Motomichi; Izushi, Minetoshi; Kawaike, Kazuhiko; and Urashin, Masayuki, to Hitachi, Ltd. Screw compressor. 4,878,820, Cl. 418-203.000.
Doll, Ronald J.; and Neustadt, Bernard R., to Schering Corporation. Mercapto-acylamino acids as antihypertensives. 4,879,309, Cl. 514-513.000.
Domigan, Charles N., to Butler Manufacturing Company. Fitting for the underside of a cellular floor. 4,879,435, Cl. 174-48.000.
Dominiak, Serge: *See*—
Muller, Jean F.; Tollitte, Francois G.; Krier, Gabriel; Dominiak, Serge; Eberhardt, Andre; and Berveiller, Marcel, 4,879,467, Cl. 250-288.000.
Donaldson Company, Inc.: *See*—
Wagner, Wayner M.; and Flemming, Douglas E., 4,878,928, Cl. 55-466.000.
Donegan, Thomas Edward: *See*—
Banties, John Henry; and Donegan, Thomas Edward, 4,879,380, Cl. 540-137.000.
Doolittle, David H.: *See*—
Halasz, Andrew; Spinelli, Giuseppe; and Doolittle, David H., 4,878,950, Cl. 106-273.100.
Dorma Door Controls, Inc.: *See*—
Nesbitt, Lanny E., 4,878,265, Cl. 16-49.000.
Dorosz, Zbigniew. Odometer with distance traveled and distance remaining displays. 4,879,732, Cl. 377-24.200.
Douglass, Stephen M.: *See*—
Pathak, Jagdish; Douglass, Stephen M.; and Vider, Dov-Ami, 4,879,481, Cl. 307-465.000.
Doumaux, Arthur R., Jr.; and Nelson, James R., to Union Carbide Chemicals and Plastics Company Inc. Process for removal of impurities in alkyl nitrite formation. 4,879,401, Cl. 558-488.000.
Doumura, Tatsuaki: *See*—
Fukui, Kumiko; Doumura, Tatsuaki; and Okamoto, Shigeo, 4,879,611, Cl. 360-69.000.
Dow Chemical Company, The: *See*—
Harris, Robert F., 4,879,357, Cl. 525-462.000.
Henton, David E., 4,879,348, Cl. 525-305.000.
McCullough, Francis P., Jr.; Hale, Frank W.; Snelgrove, R. Vernon; and Hall, David M., 4,879,168, Cl. 428-224.000.
Nakamura, Masao; and Tonokawa, Hiroshi, 4,878,520, Cl. 138-149.000.
Dow Corning Corporation: *See*—
Lo, Sunny J.; and Snow, Steven A., 4,879,051, Cl. 252-8.750.
Downing, Charles. Router bracket. 4,878,644, Cl. 248-674.000.
Doyle, James P.; and Rudolph, Lyle J. Load carrying apparatus. 4,878,605, Cl. 224-42.410.
Drageerwerk Aktiengesellschaft: *See*—
Loughlin, Patrick J.; Westenskow, Dwayne R.; Wied, Henrich A.; and Wallroth, Carl-Friedrich, 4,878,388, Cl. 73-866.400.
Drake, Lawrence V., to Infloor, Inc. Electric radiant floor heating system. 4,878,332, Cl. 52-741.000.
Drent, Eit, to Shell Oil Company. Process for carbonylation of alkenes to ketones. 4,879,417, Cl. 568-387.000.
Dresser Industries, Inc.: *See*—
Henry, Ralph E., 4,878,697, Cl. 285-250.000.
Hughes, Gustav O., 4,879,319, Cl. 523-139.000.
Drew, Jacinta: *See*—
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Drews, Robert C.: *See*—
Pasternak, Eliezer; Drews, Robert C.; and Shalon, Tadmor, 4,878,493, Cl. 128-303.140.
Drug Delivery Systems Inc.: *See*—
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Drummond, Charles J.: *See*—
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Dubertret, Alain; and Prandi, Bernard, to Compagnie Europeenne Du Zirconium Cezus. Process for improving the ductility of a product of alloy involving martensitic transformation and use thereof. 4,878,954, Cl. 148-11.50F.
Dugan, William P.; and Johnson, Marvin R., to General Dynamics Corp., Pomona Division. Electroformed chemically milled probes for chip testing. 4,878,294, Cl. 29-852.000.
Dugan, William P.; Samudrala, Rama P.; and Rivas, Grace A., to General Dynamics Corp., Pomona Division. Electroformed and chemical milled bumped tape process. 4,878,990, Cl. 156-630.000.
Dugot, Richard S.: *See*—
Levitt, Harry; Dugot, Richard S.; and Kopper, Kenneth W., 4,879,749, Cl. 381-68.400.
Duhrkoop, Jens, to Voest-Alpine AG. Device for detecting excessively heated wheel bearings and/or wheel tires. 4,878,761, Cl. 374-124.000.
Duimel, Johannes J., to Huka Developments B.V. Joystick control unit using multiple substrates. 4,879,556, Cl. 341-20.000.
Duley, Walter W.; and Kinsman, Grant. Means of enhancing laser processing efficiency of metals. 4,879,449, Cl. 219-121.600.
Dumas, Donald J.; and Moon, Marcus P., to Du Pont de Nemours, E. I., and Company. Herbicidal sulfonamides. 4,878,937, Cl. 71-90.000.
Dumestre, Alex C., II, to Western Atlas International, Inc. Latching mechanism. 4,879,719, Cl. 367-20.000.
Dunham, Byron J.; Murray, Gary P.; and Bulla, Don A., to Kent-Moore Corporation. Ultrasonic hand-held refrigerant leak detector. 4,879,546, Cl. 340-632.000.
Dunn, Douglas S.: *See*—
Ouderkirk, Andrew J.; Dunn, Douglas S.; and Warner, Robert W., 4,879,176, Cl. 428-323.000.
Du Pont de Nemours, E. I., and Company: *See*—
Boughton, John H.; Butz, Ralph A.; Cheng, Herman C. T.; Dennis, Jonathan R.; Hannon, Brian T.; and Weigel, Janet H., 4,879,043, Cl. 210-651.000.
Burn, Ian, 4,879,261, Cl. 501-32.000.
Dumas, Donald J.; and Moon, Marcus P., 4,878,937, Cl. 71-90.000.
Hanagan, Mary A., 4,878,938, Cl. 71-92.000.
Kornher, John S.; and Livak, Kenneth J., 4,879,214, Cl. 08-10/89.000.
Morgan, Richard A., 4,879,362, Cl. 526-247.000.
Nelson, Thomas L.; and Thomas, Lynn B., Sr., 4,878,280, Cl. 28-274.000.
Zafiroglu, Dimitri P., 4,879,169, Cl. 428-230.000.
Durbin, Douglas D. Dental device for cleaning teeth. 4,878,508, Cl. 132-329.000.
Duriron Company, Inc., The: *See*—
Helferich, Richard L., 4,878,947, Cl. 106-75.000.
Duta, Oprea; and Stanisic, Michael M. Dextrous spherical robot wrist. 4,878,393, Cl. 74-479.000.
Dworman, Nancy S.: *See*—
Dworman, Ralph M.; and Dworman, Nancy S., 4,878,867, Cl. 446-8.000.
Dworman, Ralph M.; and Dworman, Nancy S., to Ralphco Inc. Coin bank. 4,878,867, Cl. 446-8.000.
Dyckerhoff & Widmann Aktiengesellschaft: *See*—
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Dyer, David P. Shotgun choke insertion and removal tool. 4,878,306, Cl. 42-90.000.
Dyer, Gerald E.: *See*—
Morgan, Gene E.; and Dyer, Gerald E., 4,879,446, Cl. 219-75.000.
Dyken, Ray, to Victory Equipment (1983) Limited. Agricultural implement with foldable wing. 4,878,545, Cl. 172-776.000.
Dynamit Nobel Aktiengesellschaft: *See*—
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E.C.H. Will GmbH: *See*—
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E.I. du Pont de Nemours and Company: *See*—
Ernst, Richard E., 4,879,420, Cl. 568-617.000.
Eastman Christensen: *See*—
Ostertag, Alfred; Iversen, Robert E.; Hyland, Craig R.; Enever, Kenneth D.; and Radford, Steven R., 4,878,548, Cl. 175-340.000.
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Eastman Kodak Company: *See*—
Gebo, Charles H.; and Roth, Bradley C., 4,878,552, Cl. 177-212.000.
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Long, Michael E., 4,879,564, Cl. 346-25.000.
Mura, Albert J.; and Zercie, Robert W., 4,879,243, Cl. 436-63.000.
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Puckette, Thomas A.; Devon, Thomas J.; Phillips, Gerald W.; and Stavinoha, Jerome L., 4,879,416, Cl. 568-13.000.
Ebara Corporation: *See*—
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Kurokawa, Hideaki; Yamada, Akira; Koseki, Yasuo; Matsuzaki, Harumi; Ebara, Katsuya; Takahashi, Sankichi; Yoda, Hiroaki; Hayashi, Nobuatsu; Okouchi, Isao; Hishinuma, Yukio; and Momma, Naohiro, 4,879,041, Cl. 210-640.000.
Ebara Research Co., Ltd.: *See*—
Kanemitsu, Yoichi, 4,879,500, Cl. 318-632.000.

Ebato, Noboru: *See*—
Nishimura, Shigeoki; Fujita, Kazunori; Sugimoto, Hiroyuki; Tohyama, Atsuko; Ebato, Noboru; and Matsuda, Shinpei, 4,879,192, Cl. 429-198.000.

Eberhardt, Andre: *See*—
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Eby, George W. Shroud attachment. 4,879,549, Cl. 340-815.200.

Eckhardt, Helmut: *See*—
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Edakubo, Hiroo: *See*—
Kozuki, Susumu; Takahashi, Koji; Satoh, Keiji; Nagasawa, Kenichi; Edakubo, Hiroo; and Otokawa, Mitsuhiro, 4,879,609, Cl. 360-66.000.

Edelman, Howard; and Ritson, Carl, to Critkon, Inc. Pinch valve mechanism for a parenteral infusion system. 4,878,646, Cl. 251-9.000.

Edelstein, William A.: *See*—
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Edlich, Wilfried: *See*—
Banasiak, Lothar; Edlich, Wilfried; Lyr, Horst; Nega, Eva; and Sunkel, Marianne, 4,879,291, Cl. 514-237.800.

Eduard Kusters Maschinenfabrik GmbH & Co. KG: *See*—
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Edwards, Charles L.: *See*—
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Edwards, Philip D.: *See*—
Fulton, Janet B.; and Edwards, Philip D., 4,879,352, Cl. 525-329.300.

Edwards, William B.: *See*—
Morrish, Peter G. A.; and Edwards, William B., 4,878,276, Cl. 24-511.000.

Effland, Richard C.; Davis, Larry; Kapples, Kevin J.; and Olsen, Gordon E., to Hoechst-Roussel Pharmaceuticals, Inc. Pyrido(3,4-f)pyrrolo(1,2-b)(1,2,5)triazepines. 4,879,382, Cl. 540-554.000.

Eggerichs, Terry L. Method and apparatus for electromagnetically treating a fluid. 4,879,045, Cl. 210-695.000.

Ehara, Kenichi: *See*—
Mori, Yoshiharu; Yamada, Suzuya; Saito, Mitsuaki; Hagiwara, Hirotoshi; and Ehara, Kenichi, 4,878,866, Cl. 445-36.000.

Ehrenfellner, Hubert: *See*—
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Eichelberger, Charles W.; and Wojnarowski, Robert J., to General Electric Company. Simplified method for repair of high density interconnect circuits. 4,878,991, Cl. 156-630.000.

Eitai, Kazuo: *See*—
Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, 4,878,814, Cl. 417-63.000.

Eka Nobel AB: *See*—
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Ekmann, James M.: *See*—
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Elbe, Hans-Ludwig; Buchel, Karl H.; Schaller, Klaus; and Plempel, Manfred, to Bayer Aktiengesellschaft. Substituted hydroxyalkylazoles and their use as antimycotics. 4,879,385, Cl. 514-383.000.

ELF France: *See*—
Demangeon, Francis; and Lopez, Emile, 4,879,326, Cl. 524-61.000.

Elfab Corporation: *See*—
Kendall, Jerry A.; and Webb, David M., 4,878,861, Cl. 439-751.000.

Eli Lilly and Company: *See*—
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Eljen Corporation: *See*—
Glasser, Joseph, 4,878,421, Cl. 98-42.070.

Ellingson, Chester W., Jr., to Reese Enterprises, Inc. Insert strip for a floor covering structure. 4,879,151, Cl. 428-53.000.

Elsey, Adrian C. Alarm systems. 4,879,542, Cl. 340-326.000.

El-Sherbini, Ahmed M., to Wang Laboratories, Inc. Thresholding algorithm selection apparatus. 4,879,753, Cl. 382-50.000.

emc-tamaco a/s: *See*—
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Emerson Electric Co.: *See*—
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Emhart Industries Inc.: *See*—
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Emory University: *See*—
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Encon Industries, Inc.: *See*—
Markwardt, Herbert W., 4,878,806, Cl. 416-5.000.

Endo, Kazuo: *See*—
Kimura, Takashi; Kato, Takao; and Endo, Kazuo, 4,879,582, Cl. 357-23.120.

Endo, Kenji; Nagata, Shinichi; and Uemura, Haruo, to Dainippon Screen Mfg. Co., Ltd. Optical system for effecting increased irradiance in peripheral area of object. 4,878,745, Cl. 350-469.000.

Endo, Kimikazu: *See*—
Tasaki, Hisashi; and Endo, Kimikazu, 4,879,744, Cl. 379-144.000.

Endo, Shigeru; Nomura, Satoshi; Ishigami, Shinji; and Karibe, Sonoko, to Nisshin Flour Milling Co., Ltd. Modified gluten product and bread improver composition. 4,879,133, Cl. 426-653.000.

Endo, Takayoshi: *See*—
Kurimoto, Yukuo; and Endo, Takayoshi, 4,879,650, Cl. 364-405.000.

Endo, Toshihiko; and Matsunaga, Nobuyuki, to Polyplastics Co., Ltd. Self-iubricating thermoplastic resin wear part. 4,879,331, Cl. 524-267.000.

Endo, Tunehiro; Kato, Nobuaki; Iizuka, Kenichi; and Tajima, Fumio, to Hitachi, Ltd.; and Hitachi Engineering Co., Ltd. Speed control apparatus and method for motors. 4,879,502, Cl. 318-723.000.

Endoh, Hitoshi: *See*—
Miwa, Hideo; Tsuruoka, Kazuhiro; Yamauchi, Koudou; Endoh, Hitoshi; and Odaka, Masanori, 4,879,681, Cl. 365-189.010.

Energy Support Corporation: *See*—
Sometani, Taro; Takaoka, Naotoshi; Aida, Mitsuo; Kudomi, Mitsuharu; Tanahashi, Yasuhiro; and Aoki, Katsunori, 4,879,509, Cl. 324-108.000.

Enever, Kenneth D.: *See*—
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Engding, Alf E.: *See*—
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Engelsdorf, Kurt: *See*—
Burkel, Rainer; Engelsdorf, Kurt; Gawlik, Rolf; and Hagele, Karl-Heinz, 4,878,470, Cl. 123-401.000.

Engles, Bruce E., to Motorola, Inc. Sense amplifier precharge control. 4,879,682, Cl. 365-189.010.

English Electric Valve Company Limited: *See*—
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Eniricerche, S.p.A.: *See*—
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Environmental Delivery Systems, Inc.: *See*—
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Ephraim, Jacob. Baby nursing bottle with temperature indicator. 4,878,588, Cl. 215-11.200.

Erickson, Frederick L.: *See*—
Richeson, William E., Jr.; and Erickson, Frederick L., 4,878,464, Cl. 123-90.110.

Erico International Corporation: *See*—
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Erikson, Anders: *See*—
Ramesh, Nallepilli S.; Cheemalavagu, Suresh; and Erikson, Anders, 4,879,727, Cl. 375-76.000.

Ernest, Paul W., to Polaroid Corporation. Camera with two-bladed shutter mechanism with multiple filter apertures disposed for relative movement to provide sequential color separation exposures. 4,879,592, Cl. 358-42.000.

Ernst, Richard E., to E.I. du Pont de Nemours and Company. Preparation of mixtures of butanediols. 4,879,420, Cl. 568-617.000.

Erohlich, Klaus: *See*—
Fricker, Siegfried; and Erohlich, Klaus, 4,878,640, Cl. 248-297.200.

Eschelbach, Harald; and Klemmer, Wolfram, to Robert Bosch GmbH. Method of and apparatus for performing low-voltage correction of high-voltage deflection signals for electrostatic-deflection camera tubes in a color video camera. 4,879,593, Cl. 358-51.000.

Essilor International Cie Generale d'Optique: *See*—
Bourset, Claude; and Wajs, Georges, 4,879,072, Cl. 264-1.400.

Ethicon, Inc.: *See*—
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Ethyl Corporation: *See*—
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Presswood, J. Kenneth; and O'Quinn, Alethea H., 4,879,182, Cl. 428-408.000.

Europe Container Terminus B.V.: *See*—
Wormmeester, Gerhardus J., 4,878,587, Cl. 212-271.000.

Evans, David H., to Westinghouse Electric Corp. Turbine blades having alternating resonant frequencies. 4,878,810, Cl. 416-203.000.

Evans, Mike: *See*—
Wraight, Peter D.; Marienbach, Edouard; Hache, Jean-Michel; Rhein-Knudsen, Erik; and Evans, Mike, 4,879,463, Cl. 250-270.000.

Eveready Battery Company: *See*—
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Ewing, Donald L., to Forney International, Inc. Infrared flame detector adaptable for different fuels. 4,878,831, Cl. 431-79.000.

Ewing, Paul C.: *See*—
Dawson, Thomas F.; and Ewing, Paul C., 4,878,315, Cl. 51-165.00R.

Exmark Manufacturing Company, Incorporated: *See*—
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Exxon Chemical Patents Inc.: *See*—
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Exxon Production Research Company: *See*—
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Exxon Research and Engineering Company: *See*—
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Henderson, James K., 4,878,830, Cl. 431-10.000.
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Ezer, Elemer: *See—*
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Facon, Pierre, to Bertin & Cie. Method and apparatus for servo-controlling the position of a pneumatic actuator. 4,878,417, Cl. 91-363.00R.

Fairhall, Philip C.: *See—*
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Fallis, Robert E.: *See—*
Daly, Paul D.; Brooks, Mark A.; Fallis, Robert E.; and Cerny, Mark S., 4,878,650, Cl. 251-129.150.

Farassat, Farhad, to Emhart Industries Inc. Apparatus for manual wire bonding. 4,878,609, Cl. 228-4.500.

Farias, Otello: *See—*
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Farmery, Herbert A.: *See—*
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Farmtec B.V.: *See—*
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Fatehi, Mohammad T., to American Telephone and Telegraph Company; and AT&T Bell Laboratories. Optical transmission system. 4,878,726, Cl. 350-96.150.

Fawzi, Mahdi B.: *See—*
Mahjour, Majid; Mauser, Bernadette E.; and Fawzi, Mahdi B., 4,879,297, Cl. 514-282.000.

Feimer, Joseph L.; Koenitzer, Bernd A.; and Schucker, Robert C., to Exxon Research and Engineering Company. Highly aromatic anisotropic polyurea/urethane membranes and their use for the separation of aromatics from non aromatics. 4,879,044, Cl. 210-654.000.

Feiner, Haim, deceased: *See—*
Stefaniu, Marian; Gran, Paul; Feiner, Haim, deceased; and Feiner, Ilana, heiress, 4,879,541, Cl. 340-825.070.

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Feller, Walter J.: *See—*
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Fenoglio, Charles; Kljucaricek, Peter; Pernick, Jeffrey; and Schaedel, Fred C. Low voltage anodizing process and apparatus. 4,879,018, Cl. 204-56.100.

Fergason, James L., to Manchester R & D Partnership. Liquid crystal color display and method. 4,878,741, Cl. 350-339.00F.

Ferrant, Richard, to SGS-Thomson Microelectronics S.A. Device for the self-synchronization of the output circuits of a memory using a three-state gate. 4,879,693, Cl. 365-233.000.

Ferrato, Joseph P.; and Ferrato, Julie C., to Crystaloid Electronics Co. Liquid crystalline materials and method of making same. 4,879,061, Cl. 252-299.620.

Ferrato, Julie C.: *See—*
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Fett, James W.: *See—*
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Fey, Volker; Pachaly, Bernd; and Zeller, Norbert, to Wacker-Chemie GmbH. Process for preparing a silicon carbide protective coating. 4,879,142, Cl. 427-227.000.

Fickert, Karl-Ernst: *See—*
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Martin, Graham E.; Cockshott, Ian D.; and Fildes, Francis J. T., 4,878,908, Cl. 623-1.000.

Filisko, Frank E.; and Armstrong, William F., to Board of Regents Acting for and on Behalf of University of Michigan. Electric field dependent fluids. 4,879,056, Cl. 252-74.000.

Fischer, Janos; Dobay, Laszlo ; Major, Mihaly; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Hajos, Gyorgy; and Szporny, Laszlo , to Richter Gedeon Vegyeszeti Gyar Rt. Novel salicylates, their salts, pharmaceutical compositions containing them and process for preparing same. 4,879,404, Cl. 560-051.000.

Fischer & Porter Company: *See—*
Valentin, Jean-Pascal; Maitre, Pierre; and Kazahaya, Masahiro, 4,879,450, Cl. 219-121.640.

Fischer, Rolf: *See—*
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Fisher Controls International, Inc.: *See—*
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Fisher, Vladimir J.: *See—*
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Fisher, Wayne G., to Texas Instruments Incorporated. Integrated circuit planarization by mechanical polishing. 4,879,258, Cl. 437-225.000.

FitzGerald, Tanya E.: *See—*
Russell, Ernest J.; and FitzGerald, Tanya E., 4,878,920, Cl. 8-476.000.

Fitzgibbon, Jeremiah J., to Carbo Ceramics Inc. Sintered spherical pellets containing clay as a major component useful for gas and oil well proppants. 4,879,181, Cl. 428-402.000.

Flamig, Hans; Schutte, Andreas; Schiel, Christian; Steiner, Karl; and Mullner, Josef. Press roll for dewatering a web. 4,878,281, Cl. 29-116.100.

Flemming, Douglas E.: *See—*
Wagner, Wayner M.; and Flemming, Douglas E., 4,878,928, Cl. 55-466.000.

Flemming, J. Peter; and Dee, Robert J. Liquid dispenser. 4,878,601, Cl. 222-137.000.

Flory, Robert E.: *See—*
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Fluorographic Services, Inc.: *See—*
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FMC Corporation: *See—*
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Fogarty, Thomas J.: *See—*
Chin, Albert K., 4,878,893, Cl. 604-21.000.

Folger, Edward C.; and Witerski, Glenn S., to Storage Technology Corporation. Apparatus for laser welding and annealing. 4,879,448, Cl. 219-121.630.

Fontana, Robert E., Jr.; Howard, James K.; Lee, James H.; and Lefakis, Haralambos, to International Business Machines Corporation. Magnetoresistive read transducer. 4,879,619, Cl. 360-113.000.

Force, Carlton G., to Westvaco Corporation. Method of removing lignin from tall oil. 4,879,369, Cl. 530-205.000.

Ford, Michael G.: *See—*
Prince, Paul R.; Ford, Michael G.; Schoendorfer, Donald W.; and Clark, Ronald L., 4,879,040, Cl. 210-637.000.

Ford Motor Company: *See—*
Fuhrman, William J.; Hall, Daniel W.; and Schneider, John C., 4,878,370, Cl. 72-264.000.
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Foresta, Piero; Ghirardi, Orlando; Gabetta, Bruno; and Cristoni, Aldo, to Sigma-Tau Industrie Farmaceutiche Riunite S.p.A.; and Inverni Della Beffa Industria Chimico Farmeceutica Derivati Naturali. Triterpene saponins having anti-inflammatory, mucolytic and antiedemic activities, process for the preparation thereof and pharmaceutical compositions containing them. 4,879,376, Cl. 536-18.100.

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Forney International, Inc.: *See—*
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Forson, Henry M. Wiring test device and method. 4,879,739, Cl. 379-21.000.

Fossum, Eric R., to Inertia Dynamics, Inc. Electromagnetic clutch/-brake assembly. 4,878,568, Cl. 192-18.00B.

Foster, George N.; Petty, Herbert E.; and Blevins, Charles H., II, to Union Carbide Chemicals and Plastics Company Inc. Polysiloxanes with pendant sterically hindered phenol moiety connected to the silicon atom via a carbonylyoxy-containing link. 4,879,378, Cl. 556-439.000.

Foster, Joseph C., Jr.; and Bilek, Andrew G., to United States of America, Air Force. Bomb pallet design with hydraulic damping and fire suppressant. 4,878,415, Cl. 89-34.000.

Foundation: The Research Institute for Special Inorganic Materials, The: *See—*
Hasegawa, Yoshio; and Okamura, Kiyohito, 4,879,334, Cl. 525-474.000.

Fox, Charles; DeWitt, John W.; and Rothenberger, John D., Jr. Skin protein complexing composition for the potentiation of the substantivity of aluminum acetate through the use of a cationic emulsifier as an aid in skin healing. 4,879,116, Cl. 424-682.000.

Fox, Clarence D., to Borg-Warner Automotive, Inc. Valve assembly for a vehicular fuel tank. 4,878,511, Cl. 137-38.000.

Fox, Robert I.; and Houghton, Richard, to Scripps Clinic and Research Foundation. Synthetic polypeptides and antibodies related to Epstein-Barr virus early antigen-diffuse. 4,879,213, Cl. 435-5.000.

Frank, Juergen: *See—*
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Franks, Nicholas; and Langley, Graham A., to Amek Systems & Controls Limited. Audio production console. 4,879,751, Cl. 381-119.000.

Frano, Frank G., to Illinois Tool Works, Inc. Removable mat fastener. 4,878,792, Cl. 411-339.000.

Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.: *See—*
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Fray, Derek J.; and Morris, David R., to National Research Development Corporation. Electrochemical sensor for hydrogen sensing. 4,879,005, Cl. 204-1.00T.

Frazee, Glenn R., to S. C. Johnson & Son, Inc. Aqueous pressure sensitive adhesive compositions. 4,879,333, Cl. 524-460.000.

Frazier, Claude C.; Guha, Shekhar; and Chen, Wenpeng, to Martin Marietta Corporation. Poly-yne nonlinear optical materials. 4,879,479, Cl. 307-425.000.

Fredericksen, Arnold E.; and Richtmeyer, Robert D., to Torrington Company, The. Needle bearing rocker arm assembly. 4,878,463, Cl. 123-90.410.

Fredrickson, Roy A., to Mac Engineering & Equipment Company, Inc. Apparatus for parting and pasting battery plate grids. 4,878,521, Cl. 141-1.100.

Freeze, Robin J.; and Grimsley, John L., to Data Technology Corporation. Head positioning servo-mechanism with error reduction capabilities. 4,879,612, Cl. 360-78.060.

Freilich, Joseph A., to M. Fabrikant & Sons, Inc. Double faced jewelry setting. 4,878,364, Cl. 63-28.000.

Freisinger, Henry: *See—*
Stritzl, Karl; Luschnig, Franz; Riegler, Andreas; Wurthner, Hubert; and Freisinger, Henry, 4,878,687, Cl. 280-605.000.

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Seyffart, Gunther; Rothe, Wolfgang; Bartz, Volker; and Bartz, Volker, 4,879,280, Cl. 514-53.000.

Fricker, Siegfried; and Erohlich, Klaus, to Fricker, Siegfried. Toothed anchoring rail. 4,878,640, Cl. 248-297.200.

Fridsma, Daniel E., to Westinghouse Electric Corp. Turbine governor valve monitor. 4,878,348, Cl. 60-660.000.

Fried, Herbert E.; and Edwards, Charles L., to Shell Oil Company. Reaction of olefins with maleic anhydride. 4,879,394, Cl. 549-255.000.

Friedman, Ira L.: *See—*
Saltzman, Gilbert A.; Wertz, Timothy A.; and Friedman, Ira L., 4,878,953, Cl. 148-4.000.

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Frito-Lay, Inc.: *See—*
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Froix, Michael F.: *See—*
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Fuchs, Peter, to Nova-Werke AG. Diesel fuel injection device with preinjection. 4,878,471, Cl. 123-446.000.

Fuehrer, Diethelm, to Siemens Aktiengesellschaft. Method for determining points in space guiding the movement of a robot arm. 4,879,663, Cl. 364-513.000.

Fuerstenberg, Gary D.: *See—*
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Fuhrman, William J.; Hall, Daniel W.; and Schneider, John C., to Ford Motor Company. Cold extrusion process for internal helical gear teeth. 4,878,370, Cl. 72-264.000.

Fuji Electric Co., Ltd.: *See—*
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Fuji Photo Film Co., Ltd.: *See—*
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Ishigaki, Kunio; Takahashi, Toshiro; Mihara, Yuji; Adachi, Keiichi; Ohno, Shigeru; Okada, Masahiro; and Saeki, Naomi, 4,879,204, Cl. 430-512.000.
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Fujii, Katsuyuki, to Minolta Camera Kabushiki Kaisha. Ink jet printer. 4,879,565, Cl. 346-75.000.

Fujii, Kazuo, to Diesel Kiki Co., Ltd. Demisting control system of air conditioner for automotive vehicles. 4,878,358, Cl. 62-227.000.

Fujikawa, Shigeaki: *See—*
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Fujiki, Hironao: *See—*
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Fujikura Ltd.: *See—*
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Fujimori, Yasutomo: *See—*
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Fujino, Kiyoshi: *See—*
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Fujio, Yoshiharu; Matsukuma, Kanemasa; and Nishimoto, Toshihiko, to Daiso Co., Ltd. Organic glass for optical parts. 4,879,363, Cl. 526-314.000.

Fujisawa, Mitsuo. Pleated cloth and method for producing the same. 4,879,155, Cl. 428-131.000.

Fujita, Kazunori: *See—*
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Fujitsu Limited: *See—*
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Fukui, Kumiko; Doumura, Tatsuaki; and Okamoto, Shigeo, to Sanyo Electric Co., Ltd. Record mode setting apparatus responsive to transmitted code containing time-start information. 4,879,611, Cl. 360-69.000.

Fukui, Yuko: *See—*
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Fukumoto, Hiroshi; Namura, Koji; Naruki, Kenichi; and Une, Ryuzo, to Mitsubishi Denki Kabushiki Kaisha. Thermal transcription printer. 4,878,772, Cl. 400-120.000.

Fukunaga, Yukio: *See—*
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Fukuoka, Tatsuhiko; and Suzuki, Takashi, to Taiho Kogyo, Ltd. Bearing having an improved corrosion-resistance. 4,878,768, Cl. 384-279.000.

Fukushima, Yaichi: *See—*
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Fukushima, Yoshihisa: *See—*
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Fukutomi, Hiroshi: *See—*
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Fulton, Janet B.; and Edwards, Philip D., to Polysar Limited. Adducts of an aminoalcohol and nitrile rubber. 4,879,352, Cl. 525-329.300.

Funahashi, Takahiko: *See—*
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Furholz, Urs J., to Ciba-Geigy AG. Process for producing masked positive color images by the silver dye bleach process. 4,879,203, Cl. 430-378.000.

Furukama, Kazuyoshi: *See—*
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Furuuchi, Toshiharu, to Central Glass Company, Limited. Decorative foamed glass with dense glass surface layer and method of producing same. 4,879,159, Cl. 428-161.000.

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Gabrielidis, Pericles. Hand-carried weapon. 4,878,305, Cl. 42-72.000.

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GAO Gesellschaft fur Automation und Organisation mbH: *See—*
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Garcia, Virgilio N., to Texas Instruments Incorporated. A gaas register file having a plurality of latches. 4,879,683, Cl. 365-189.050.

Garde, Anand M., to Combustion Engineering, Inc. Ductile irradiated zirconium alloy. 4,879,093, Cl. 420-422.000.

Gardner, Donald. Planter trash guard. 4,878,443, Cl. 111-141.000.

Gardner, Kenneth H. Wrist watch. 4,879,702, Cl. 368-282.000.
Gardner, Steven H.: *See*—
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Gardner, Thomas A. Epicycloid rolling resistance abatement. 4,878,525, Cl. 152-14.000.
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Garg, Shaym G.: *See*—
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Garrison, Michi E.; and Pelmulder, John P., to Pacesetter Infusion, Ltd. Cassette optical identification apparatus for a medication infusion system. 4,878,896, Cl. 604-65.000.
Gart, Mark, to Sun-Flex Company, Inc. Laser cut video display terminal filter screen. 4,879,451, Cl. 219-121.690.
Garwin, Jeffrey L.: *See*—
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Watson, James E.; and Davies, Theodore E., 4,878,480, Cl. 126-91.00A.
Gasper, Elon; and Goedert, Nedra, to Bright Star Technology, Inc. Teaching aid having tactile feedback. 4,878,844, Cl. 434-159.000.
Gausa, Alexander, to Feldmuehle Aktiengesellschaft. Process for determining dimension errors. 4,879,000, Cl. 162-198.000.
Gawlik, Keith M.: *See*—
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Gawlik, Rolf: *See*—
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Geile, Michael; Dapper, Mark; and Hill, Terrance, to Cincinnati Electronics Corporation. Phase lock loop and improved phase detector therefor. 4,879,527, Cl. 331-1.00A.
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De Munck, Johannes W. J.; and Lohmeijer, Johannes H. G. M., 4,879,330, Cl. 524-151.000.
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Nowak, David J., 4,879,652, Cl. 364-413.180.
Roemer, Peter B.; and Edelstein, William A., 4,879,515, Cl. 324-318.000.
Smith, Kennith A.; and Haig, Connie L., 4,879,317, Cl. 521-82.000.
Toutant, Roy T.; Perry, David S.; Brennan, Michael A.; Kreko, James E.; and Dilk, Mark A., 4,878,368, Cl. 72-9.000.
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Grossman, Mark W.; and George, William A., 4,879,010, Cl. 204-105.00R.
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Randall, Brian G., 4,879,173, Cl. 428-285.000.
Georgiou, Christos J.; Lien, Yeong-Chang L.; and Maruyama, Kiyoshi, to International Business Machines Corporation. Switching array with concurrent marking capability. 4,879,551, Cl. 340-825.870.
Gerdt, David W., to Sperry Marine Inc. Fiber optic fabrication furnace. 4,879,454, Cl. 219-494.000.
Gerritsen, Hendrik J., to Brown University Research Foundation. Apparatus and method for rapidly constructing holograms. 4,878,717, Cl. 350-3.660.
Gershon, Eugen, to Advanced Micro Devices, Inc. Fast sample and hold circuit. 4,879,478, Cl. 307-353.000.
Gesellschaft fur Biotechnologische Forschung mbH (GBF): *See*—
Cordes, Arno; Kula, Maria-Regina; Kroner, Karl-Heinz; and Stach, Wolfgang, 4,879,234, Cl. 435-189.000.
Getman, Daniel P.; and Heintz, Robert M., to Monsanto Company. Solid phase peptide synthesis. 4,879,371, Cl. 530-334.000.
Getman, Daniel P.; Periana, Roy A.; and Riley, Dennis P., to Monsanto Company. Process for producing 2,6-disubstituted tyrosine. 4,879,398, Cl. 556-413.000.
Getreuer, Kurt W.; Verboom, Johannes J.; and Sonneville, Pierre R., to Laser Magnetic Storage International Company. Optical disk tracking and seeking systems specific track formats using discontinuities. 4,879,707, Cl. 369-46.000.
Getreuer, Kurt W.; and Verboom, Johannes J., to Laser Magnetic Storage International Company. Optical disk tracking and seeking systems specific track formats using wobbled pits. 4,879,708, Cl. 369-46.000.
Ghandehari, Mohammad H., to Union Oil Company of California. Method for preparing rare earth-iron-boron permanent magnets. 4,878,958, Cl. 148-103.000.
Ghirardi, Orlando: *See*—
Foresta, Piero; Ghirardi, Orlando; Gabetta, Bruno; and Cristoni, Aldo, 4,879,376, Cl. 536-18.100.
Giardina, Jacob; and Rodrigue, Kenneth, to Cameco Industries, Inc. Boom and grapple configuration for loading wholestalk cut sugar cane and method of operation. 4,878,341, Cl. 56-364.000.
Gibbons, James F.: *See*—
Reynolds, Scott K.; Vook, Dietrich W.; and Gibbons, James F., 4,879,259, Cl. 437-247.000.
Gibbons, John E. C.: *See*—
Whitehead, Thomas P.; Thorpe, Gary H. G. H.; Kricka, Larry J.; Gibbons, John E. C.; and Bunce, Roger A., 4,879,097, Cl. 422-67.000.
Gibot, Claude; Peyremorte, Jean-Pierre; and Sojka, Richard, to Carboxyque Francaise; and Societe Nouvelle Des Etablissements J. Lagarde. Chamber and process for thermal treatment comprising a cooling phase. 4,878,353, Cl. 62-52.100.
Gibson, John. Debris diverting boom. 4,879,028, Cl. 210-169.000.
Gick, Wilhelm: *See*—
Bach, Hanswilhelm; Bahrmann, Helmut; Cornils, Boy; Gick, Wilhelm; Heim, Volker; Konkol, Werner; and Wiebus, Ernst, 4,879,418, Cl. 568-454.000.
Gilbreath-Frandsen, C.; and Wagner, James W., to United States of America, Navy. Method for holographic correction of beams of coherent light. 4,878,718, Cl. 350-3.690.
Gilchrist, R. Fowler. Restraining pipe joint. 4,878,698, Cl. 285-342.000.
Gillet, Xavier, executor: *See*—
Meunier, Jean-Paul, deceased, 4,879,172, Cl. 428-280.000.
Gillett, John B.; Lohrey, Fred H.; and Lorenzen, Jerry A., to International Business Machines Corporation. Parallel cable bus with internal path length compensation. 4,879,433, Cl. 174-32.000.
Giordani, Antonio; and Vecchietti, Vittorio, to Dr. Lo. Zambeletti S.p.A. Novel piperidine derivatives. 4,879,300, Cl. 514-317.000.
Giorgi, Raffaello; Conti, Marisa; and Pifferi, Giorgio, to Inverni della Beffa S.p.A. Derivatives of benzoyloxyacetic acid, and preparation and formulations thereof for therapeutic use. 4,879,311, Cl. 514-533.000.
Giovine, Robert L. Tissue container and waste tissue receptacle. 4,879,442, Cl. 206-233.000.
Givaudan Corporation: *See*—
Losi, Salvatore A., 4,878,615, Cl. 239-45.000.
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Glasser, Joseph, to Eljen Corporation. Radon venting system for existing structures. 4,878,421, Cl. 98-42.070.
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Thomas, Jean-Francois; Terneu, Robert; Van Cauter, Albert; and Van Laethem, Robert, 4,878,934, Cl. 65-60.520.
Glenn, William E., to New York Institute of Technology. Electrode patterns for solid state light modulator. 4,879,602, Cl. 358-233.000.
Glidden Company, The: *See*—
Woo, James T. K.; Reising, John C.; Marcinko, Richard M.; and Miles, David E., 4,879,344, Cl. 525-100.000.
Global Holonetics Corporation: *See*—
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Goel, Anil B.; and Holehouse, Joseph G., to Ashland Oil, Inc. Bonding method employing high performance induction curable two-component structural adhesive with nonsagging behavior. 4,878,978, Cl. 156-272.400.
Goetz, Bernhard. High voltage measurement capacitor. 4,879,628, Cl. 361-327.000.
Goetze, Leppold: *See*—
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Golden Valley Microwave Foods, Inc.: *See*—
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Goodman, Lynn R. Method of testing catalytic converters and oxygen sensors. 4,878,380, Cl. 73-118.100.
Goodrich, Robert L., to Pneumafil Corporation. Dust collector. 4,878,926, Cl. 55-294.000.
Gordon, Gerald M.: *See*—
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Gorski, Werner; and Huber, Josef, to Dr. Johannes Heidenhain GmbH. Process for generating a computer model of an alterable structure. 4,879,667, Cl. 364-522.000.
Gostic, William J.; Khan, Abdus S.; and Murphy, Kenneth S., to United Technologies Corporation. Oxidation resistant superalloy single crystals. 4,878,965, Cl. 148-404.000.
Gotanda, Masakazu, to Olympus Optical Co., Ltd. Ultrasonic oscillation circuit. 4,879,528, Cl. 331-4.000.
Goto, Hiroshi: *See*—
Moriya, Yasuo; Suzuki, Nobuyoshi; and Goto, Hiroshi, 4,879,347, Cl. 525-263.000.
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Gottshall, R. Marc, to Boeing Company, The. Object positioning apparatus and method. 4,879,644, Cl. 364-167.010.
Goudy, Paul R., Jr., to Photo Redux Corp. Radiation-emitting devices. 4,879,489, Cl. 313-15.000.
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Gowan, John W., Jr., to Westvaco Corporation. Non-alum sizing. 4,878,999, Cl. 162-164.600.
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Henkels, Wolf-Dieter; and Balzer, Marion, 4,879,306, Cl. 514-441.000.
Grado, Gilbert R., to Rockwell International Corporation. Difar demultiplexer circuit. 4,879,694, Cl. 367-3.000.
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Stefaniu, Marian; Gran, Paul; Feiner, Haim, deceased; and Feiner, Ilana, heiress, 4,879,541, Cl. 340-825.070.
Grant, David C. H., to Quadrex HPS Inc. Two stage vapor recovery system. 4,878,931, Cl. 62-17.000.
Grant, Louis A., to Louis A. Grant, Inc. Apparatus for cleaning titanium pots. 4,878,789, Cl. 409-143.000.
Grantham, Daniel H., to United Technologies Corporation. Differential capacitive pressure sensor with over-pressure protection. 4,879,627, Cl. 361-283.000.
Gras, Rainer, to Huels Aktiengesellschaft. Method of manufacturing single-component polyurethane baking enamels. 4,879,356, Cl. 525-440.000.
Gray, Howard R.; Shimshock, Richard P.; and Krisl, Matthew E., to Deposition Sciences, Inc. Method for making pigment flakes. 4,879,140, Cl. 427-38.000.
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Great Lakes Chemical Corporation: *See*—
Sanders, David C.; Sands, John L.; and Stahl, Joseph L., 4,879,353, Cl. 525-357.000.
Grecksch, Hans; Bertrams, Josef; and Bucken, Rene, to W. Schlafhorst & Co. Reserve winding of yarn on a tube of a cross-wound bobbin and method and appartus of forming same. 4,878,629, Cl. 242-18.0PW.
Greco, Ralph S.; Harvey, Richard A.; and Trooskin, Stanley Z., to University of Medicine and Dentistry of New Jersey. Drug bonded prosthesis and process for producing same. 4,879,135, Cl. 427-2.000.
Green, Allan C.: *See*—
Buck, Arnold L.; and Green, Allan C., 4,879,601, Cl. 358-213.220.
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Greenway, John M. Caulking nozzle. 4,878,599, Cl. 222-1.000.
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Griffin, Joseph C.; and Skaggs, James L., to Nova Medical Specialties. Thermodilution and pressure transducer balloon catheter. 4,878,898, Cl. 604-101.000.
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Gross, Jeffrey S.: *See*—
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Grossman, Mark W.; and George, William A., to GTE Products Corporation. Recovery of mercury from mercury compounds via electrolytic methods. 4,879,010, Cl. 204-105.00R.
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GTE Products Corporation: *See*—
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Hsieh, Martin Y., 4,879,080, Cl. 264-63.000.
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GTE Valenite Corporation: *See*—
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Hach, Clifford C.; and Gawlik, Keith M., to Hach Company. Programmable fertilizer application system. 4,878,614, Cl. 239-10.000.
Hach Company: *See*—
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Hagshenas, Behzad, to Sundstrand Corporation. Blower for use in particle contaminated environments. 4,878,805, Cl. 415-169.100.

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Halasz, Andrew; Spinelli, Giuseppe; and Doolittle, David H., to Exxon Chemical Patents Inc. Bitumen composition. 4,878,950, Cl. 106-273.100.

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Hall, David M.: *See*—
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Hall, James B.; Robinson, Martin G.; and Swift, Ronald C., to Motorola, Inc. Gettering process for semiconductor wafers. 4,878,988, Cl. 156-600.000.

Hall, John W., Jr.: *See*—
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Haller, Bernd; Herkner, Ernst; Murray, Peter; Riesenberg, Volker; Schnatwinkel, Michael; Schulze, Rainer; Wagner, Georg; and Wilmes, Manfred, to C. A. Weidmuller GmbH. Support assembly for an electrical terminal housing. 4,878,859, Cl. 439-716.000.

Hallermayer, Klaus; Looser, Siegfrid; and Katus, Hugo, to Boehringer Mannheim GMBH. Specific antibody against heart muscle light chains, a process for the preparation thereof and a reagent containing it. 4,879,216, Cl. 435-7.000.

Halliburton Company: *See*—
Christensen, Jon B., 4,878,538, Cl. 166-264.000.

Halverson, Danny C.; Lum, Beverly Y.; and Munir, Zuhair A., to United States of America, Energy. Combustion synthesis of boride and other composites. 4,879,262, Cl. 501-87.000.

Halverson, Larry J.: *See*—
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Hamada, Tetsuro; Masuda, Katsuhiko; Shibuya, Kazunori; Shimada, Kazuhiko; Fujii, Etsuo; Ikegami, Hiroshi; and Furuya, Kunitaka, to Honda Giken Kogyo Kabushiki Kaisha. Method and mechanism for selectively transmitting and interrupting delivery of power. 4,878,566, Cl. 192-13.00R.

Hamill James J.: *See*—
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Hamm, Sidney R.; and Wainio, Ronald A., to Cooper Industries, Inc. Dielectric barrier for a vacuum interrupter. 4,879,441, Cl. 200-144.00B.

Hanabusa, Tadashi, to Canon Kabushiki Kaisha. Thermal recording apparatus. 4,879,566, Cl. 346-76.0PH.

Hanagan, Mary A., to Du Pont de Nemours, E. I., and Company. Herbicidal Sulfonamides. 4,878,938, Cl. 71-92.000.

Hanami, Takayoshi, to Seiko Instruments, Inc. Electro-optical device. 4,878,738, Cl. 350-334.000.

Handelsman, Jo E.; and Halverson, Larry J., to Wisconsin Alumni Research Foundation. Method to enhance root nodulation in legumes and inoculum preparation therefor. 4,878,936, Cl. 71-7.000.

Handley, James R.: *See*—
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Haner, Lambert, to Commercial Shearing, Inc. Constant speed hydrostatic drive system. 4,879,501, Cl. 318-645.000.

Hanke, Peter; and Postanschrift, Wie, to Optische Werke G. Rodenstock. Device for deflecting a bundle of light rays. 4,878,720, Cl. 350-6.400.

Hannon, Brian T.: *See*—
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Hannon, Douglas; and McClellan, Bingham A., to McClellan Industries, Inc. Magnetic fishing bait and method. 4,878,310, Cl. 43-42.040.

Hansen, Craig C., to MIPS Computer Systems, Inc. Method and apparatus for precise floating point exceptions. 4,879,676, Cl. 364-748.000.

Hansen, James B., Sr. Buryable warning tape. 4,879,162, Cl. 428-196.000.

Hansen, Loren F.; Huber, Donald J., deceased (by Huber, Lisa A., beneficiary); and Oliver, Joseph J., to Outboard Marine Corporation. Machine for collecting ground particles and the like. 4,878,802, Cl. 414-523.000.

Hanson, Donald N.; and Lynn, Scott. Method of crystallizing salts from aqueous solutions. 4,879,042, Cl. 210-642.000.

Hanson, Jay L.; and Howland, Leland L., to Thermo King Corporation. Control for automatically starting a diesel engine. 4,878,465, Cl. 123-179.0BG.

Hanssler, Gerd: *See*—
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Hanyu, Yukio; and Futami, Yukiko, to Canon Kabushiki Kaisha. Liquid crystal device. 4,879,059, Cl. 252-299.400.

Hanyuda, Ken; and Ohara, Michimasa, to Fujitsu Limited. Optical repeater and regulated current feeding system for the same. 4,879,762, Cl. 455-601.000.

Hara, Hitoshi, to Sumitomo Heavy Industries, Ltd. Injection molding machine having selectively controllable motors. 4,878,824, Cl. 425-139.000.

Hara, Kenji: *See*—
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Harada, Hiroshi: *See*—
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Harada Kogyo Kabushiki Kaisha: *See*—
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Harada, Manabu, to Kabushiki Kaisha Marukomu. Rotating viscometer. 4,878,378, Cl. 73-59.000.

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Harandi, Mohsen N., to Mobil Oil Corporation. Conversion of alkanes to gasoline. 4,879,424, Cl. 585-322.000.

Harandi, Mohsen N.; and Owen, Hartley. Upgrading lower olefins. 4,879,428, Cl. 585-533.000.

Harbor Branch Oceanographic Institution, Inc.: *See*—
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Cotreau, Gerald M., 4,879,523, Cl. 330-288.000.

Harris, James E.; Matzner, Markus; and Robeson, Lloyd M., to Amoco Corporation. Miscible blends of an amide and/or imide containing polymer and a polyarylate. 4,879,354, Cl. 525-425.000.

Harris, Jesse R.: *See*—
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Harris, Robert F., to Dow Chemical Company, The. Novel poly(alkylene carbonate) polyahls having more than one pendant acid group. 4,879,357, Cl. 525-462.000.

Harrison, John R.; Lehr, Gary L.; Parr, Dennis J.; Ward, William F., Jr.; and Wells, Robert R., to Ward Machinery Company, The. Vacuum die mount. 4,878,407, Cl. 83-13.000.

Harth & Seifert GmbH: *See*—
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Hartman, Stuart J.: *See*—
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Hasegawa, Akira, to Fuji Photo Film Co., Ltd. Method of making a lithographic plate comprising microcapsules. 4,879,201, Cl. 430-138.000.

Hasegawa, Takafumi: *See—*
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Hasegawa, Yoshio; and Okamura, Kiyohito, to Foundation: The Research Institute for Special Inorganic Materials, The. Organopolyarylsilanes, process for manufacturing the same and fibers comprising the same. 4,879,334, Cl. 525-474.000.

Hasenack, Marvin L., Jr.: *See—*
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Hashimoto, Masahiro: *See—*
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Hastings, Otis H. Intumescent fire-retardant coating material. 4,879,320, Cl. 523-179.000.

Hata, Kosei, to Seikenkai. Deodorant and method for preparing and storing same. 4,879,238, Cl. 435-244.000.

Hatakoshi, Makoto: *See—*
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Haughton, Victor M.: *See—*
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Hayasaka, Sigeki: *See—*
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Hayashi, Hiroshi: *See—*
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Hayes Industrial Brake, Inc.: *See—*
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Hekker, Roeland M. T.; and Livny, Izhak M., to Global Holonetics Corporation. Control means and method for optical inspection system. 4,878,736, Cl. 350-162.130.

Helferich, Richard L., to Duriron Company, Inc., The. Method for manufacture of porous refractory articles. 4,878,947, Cl. 106-75.000.

Hemingway, Trevor: *See—*
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Henkel Corporation: *See—*
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Henneken, Bernhard; Kammerling, Bruno; Scholz, Eckhard-K.; Schroder, Wolfgang; and Krause, Hans, to Man Gutehoffnungshuette, GmbH. Furnace charging throat construction. 4,878,655, Cl. 266-184.000.

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Hensley, John J.; Waldhelm, Christian M.; Tohill, Henry J.; and Kubarych, Kenneth G., to Solar Turbines Incorporated. High temperature metallic gasket. 4,878,678, Cl. 277-235.00A.

Henton, David E., to Dow Chemical Company, The. Crosslinked and grafted overpolymer acrylate rubbers. 4,879,348, Cl. 525-305.000.

Hercules Incorporated: *See—*
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Heron, Roger A.; and Saunders, David H., to British Hydromechanics Research Association, The. Abrasive fluid flow. 4,878,785, Cl. 406-194.000.

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Herrlein, Wilhelm: *See—*
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HEWI Heinrich Wilke GmbH: *See—*
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Horiki, Seinosuke; Makino, Reiji; and Iwata, Hisami, to Nagoya Oilchemical Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Masking member. 4,879,158, Cl. 428-159.000.
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Hino, Yusuke; Horimoto, Tohru; Gemma, Hideaki; Iwata, Toshiharu; and Yamada, Kimitoshi, 4,879,550, Cl. 340-825.050.
Hormann KG Brockhagen: *See*—
Hormann, Michael, 4,878,529, Cl. 160-201.000.
Hormann, Michael, to Hormann KG Brockhagen. Sectional overhead door for low lintel heights. 4,878,529, Cl. 160-201.000.
Horwitz, E. Philip: *See*—
Alexandratos, Spiro D.; Danesi, Pier R.; and Horwitz, E. Philip, 4,879,316, Cl. 521-27.000.
Hoshino, Kazuo; and Igawa, Takashi, to Nisshin Steel Company, Ltd. Process for preparing a high strength stainless steel having excellent workability and free form weld softening. 4,878,955, Cl. 148-12.00E.
Hoshinouchi, Susumu: *See*—
Zumoto, Nobuyuki; Sakamoto, Masahiko; and Hoshinouchi, Susumu, 4,879,473, Cl. 250-492.200.
Hosoda, Rokuro. Golf club. 4,878,666, Cl. 273-79.000.
Hosoi, Yuichi; Arakawa, Satoshi; and Takahashi, Kenji, to Fuji Photo Film Co., Ltd. Radiation image storage panel and process for the preparation of the same. 4,879,202, Cl. 430-139.000.
Houghton, Richard: *See*—
Fox, Robert I.; and Houghton, Richard, 4,879,213, Cl. 435-5.000.
Howard, Harry R., Jr.; and Sarges, Reinhard, to Pfizer Inc. 1-Phenyl-2(1H,3H)-indolone psychotherapeutic agents. 4,879,391, Cl. 548-486.000.
Howard, James K.: *See*—
Fontana, Robert E., Jr.; Howard, James K.; Lee, James H.; and Lefakis, Haralambos, 4,879,619, Cl. 360-113.000.
Howe, Steve R., to An-Tech International Livestock Products. Animal tail tag for insecticide protection. 4,878,456, Cl. 119-156.000.
Howell, Henry G.: *See*—
Brundidge, Steven P.; Howell, Henry G.; Sapino, Chester, Jr.; and Hong-Tann, Chou, 4,879,377, Cl. 536-18.200.
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Hoxmeier, Ronald J., to Shell Oil Company. Selective hydrogenation process. 4,879,349, Cl. 525-332.800.
HRI, Inc.: *See*—
Hippo, Edwin J.; Comolli, Alfred G.; and O'Brien, Robert, 4,879,021, Cl. 208-413.000.
Hsieh, Martin Y., to GTE Products Corporation. Formation of lanthanum aluminate. 4,879,079, Cl. 264-56.000.
Hsieh, Martin Y., to GTE Products Corporation. High density silicon nitride bodies. 4,879,080, Cl. 264-63.000.
Hsu, Adam C. Dihaloformaldoxime. 4,879,314, Cl. 514-640.000.
Hsu, Chien-Yeh; McGee, Frank J.; and Banks, Roger L., to Wangner Systems Corporation. Method for manufacture of paper making fabrics. 4,878,278, Cl. 28-142.000.
Huang, Liang: *See*—
Chen, Yen-rong; Yang, Ming-he; Huang, Liang; Liu, Geng-tao; and Benz, Ulrich, 4,879,390, Cl. 548-453.000.
Huang, Shyh-Chin, to General Electric Company. Titanium aluminum alloys modified by chromium and niobium and method of preparation. 4,879,092, Cl. 420-418.000.
Huber, Donald J., deceased: *See*—
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Huber, Josef: *See*—
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Huchet, Gerard: *See*—
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Huck Manufacturing Company: *See*—
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Hueis Aktiengesellschaft: *See*—
Gras, Rainer, 4,879,356, Cl. 525-440.000.
Huether, Werner; Rossman, Axel; and Sikorski, Siegfried, to MTU Motoren-und Turbinen-Union Munchen GmbH. Detachable anti-rupture ring for the housing of a turbo power plant. 4,878,821, Cl. 415-9.000.
Hufnagel, Nick L., to United Technologies Corporation. Wear resistant, self-damping clamp assembly. 4,878,618, Cl. 239-265.390.
Huggett, Tryon V.: *See*—
Watkins, Donald M.; Huggett, Tryon V.; and Martt, Judson F., 4,878,551, Cl. 177-139.000.
Huggins, George R.: *See*—
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Hughes Aircraft Company: *See*—
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McVey, Michael J., 4,879,504, Cl. 323-272.000.
Rosen, Harold A., 4,879,711, Cl. 370-50.000.
Wall, Stephen W., 4,878,730, Cl. 350-96.210.
Wreede, John E.; Scott, James E.; and Upper, Richard B., 4,878,719, Cl. 350-3.750.
Hughes, Gustav O., to Dresser Industries, Inc. Anhydrous refractory plastic. 4,879,319, Cl. 523-139.000.
Hughes, Trevor L.: *See*—
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Huka Developments B.V.: *See*—
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Hull, Robert W. Realignment tool for aperture mating surface. 4,878,371, Cl. 72-390.000.
Hullmann, Michael: *See*—
Piejko, Karl-Erwin; Bomer, Bruno; Buysch, Hans-Josef; and Hullmann, Michael, 4,879,367, Cl. 528-371.000.
Hunt, Carl E., to GTE Valenite Corporation. Coarse/fine adjustment boring head. 4,878,787, Cl. 408-181.000.
Hunter Engineering Company: *See*—
Colarelli, Nicholas J., III, 4,879,670, Cl. 364-559.000.
Hunter, Robert L., to Emory University. Method for treating burns. 4,879,109, Cl. 424-83.000.
Hurst, Ronald C.: *See*—
List, Steven J.; and Hurst, Ronald C., 4,879,104, Cl. 423-450.000.
Huss, John B., to Sundstrand Corporation. Alternating current generator and method of angularly adjusting the relative positions of rotors thereof. 4,879,484, Cl. 310-114.000.
Husted, Royce H. Liquid indicator gauge. 4,878,298, Cl. 33-837.000.
Hydro-Craft, Inc.: *See*—
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Hydro Energy Systems, Ltd.: *See*—
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Larkins, David J.; and Schneider, John C., 4,878,677, Cl. 277-105.000.
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i f m Electronic GmbH: *See*—
LaMarche, Jean-Luc, 4,879,474, Cl. 307-116.000.
Ichikawa, Wataru; and Matsuki, Yuji, to Kabushiki Kaisha SG. Absolute linear position detection device. 4,879,555, Cl. 341-13.000.
Ichikoh Industries: *See*—
Yamagishi, Hirofumi; Segoshi, Tooru; Shigemura, Kouji; Nakata, Yutaka; Yoneyama, Hirokazu; and Yamashita, Mototsugu, deceased, 4,879,636, Cl. 362-61.000.
Ichikoh Industries Limited: *See*—
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Ichiyoshi, Osamu, to NEC Corporation. Satellite-based vehicle communication/position determination system. 4,879,713, Cl. 370-75.000.
ICI Americas Inc.: *See*—
Warawa, Edward J.; and Migler, Bernard M., 4,879,288, Cl. 514-211.000.
Ida, Masao: *See*—
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Ideation Enterprises, Inc.: *See*—
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Igel, Wolfgang, to Zinser Textilmaschinen GmbH. Method and device for auotmatically splicing yarn on a ring spinning machine. 4,878,344, Cl. 57-261.000.
IGI Biotechnology, Inc.: *See*—
Mays, Thomas D.; and Dally, Ellen L., 4,879,228, Cl. 435-101.000.

Iguchi, Hiroyuki: *See*—
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Iijima, Kenzaburou; and Hayashi, Yoshinori, to Yamaha Corporation. Input circuit for a digital phase locked loop. 4,879,674, Cl. 364-724.030.
Iijima, Mutsuo. Optical disc protector and method for applying same. 4,879,710, Cl. 369-291.000.
Iinuma, Kazuhiro, to Kabushiki Kaisha Toshiba. Radiation imaging apparatus. 4,879,464, Cl. 250-361.00R.
Iizuka, Kenichi: *See*—
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Ikada, Yoshito: *See*—
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Ikeda, George; and Walker, William B., to Ikege, Inc. Insulating plastic film structures and method. 4,878,322, Cl. 52-2.000.
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Ikege, Inc.: *See*—
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Ikesue, Masumi; and Ikeda, Takashi, to Ricoh Company, Limited. Toner replenishing device. 4,878,603, Cl. 222-167.000.
Ikovich, George J.: *See*—
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IMI Yorkshire Fittings Limited: *See*—
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Imperial Chemical Industries Plc: *See*—
Adkins, Kelvin P., 4,879,064, Cl. 252-500.000.
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Inaba, Takihiro: *See*—
Sadaki, Hiroshi; Narita Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, 4,879,381, Cl. 540-222.000.
Inaba, Yutaka; and Taniguchi, Osamu, to Canon Kabushiki Kaisha. Liquid crystal device. 4,878,740, Cl. 350-337.000.
Independent Technologies, Inc.: *See*—
Ingalsbe, David L., 4,878,848, Cl. 439-76.000.
Inertia Dynamics, Inc.: *See*—
Fossum, Eric R., 4,878,568, Cl. 192-18.00B.
Infloor, Inc.: *See*—
Drake, Lawrence V., 4,878,332, Cl. 52-741.000.
Ingalsbe, David L., to Independent Technologies, Inc. 110 Block adapter. 4,878,848, Cl. 439-76.000.
Ingersoll-Rand Company: *See*—
Lennon, Archie A., 4,878,547, Cl. 175-53.000.
Inkol, Robert J., to Canada, Her Majesty the Queen in Right of. Filter system for radar applications. 4,879,561, Cl. 342-195.000.
Innovative Therapeutic Designs, Inc.: *See*—
Luquette, Michael M., 4,878,663, Cl. 272-134.000.
Inomata, Fumio: *See*—
Yasunaga, Osamu; Wakusaka, Kazuharu; Inomata, Fumio; and Tsuchiya, Toshio, 4,878,555, Cl. 180-68.300.
Inomata, Hiroshi: *See*—
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Inomata, Kenichi: *See*—
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Mizoguchi, Tetsuhiko; Inomata, Koichiro; Higuchi, Toru; and Sakai, Isao, 4,878,964, Cl. 148-302.000.
Inoue, Sadahiro: *See*—
Tabayashi, Isao; Harada, Hiroshi; Inoue, Sadahiro; and Fukutomi, Hiroshi, 4,878,946, Cl. 106-27.000.
Inoue, Tai; Sugita, Masaya; and Okamoto, Keiji, to Yazaki Corporation. Indicating instrument for automotive vehicle. 4,878,453, Cl. 116-288.000.
Inoue, Takayuki: *See*—
Kobayashi, Yoshinobu; Itou, Tosio; and Inoue, Takayuki, 4,879,360, Cl. 525-396.000.
Institut Francais du Petrole: *See*—
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Institut fuer Pflanzenschutzforschung Kleinmachnow der Akademie der Landwirtschaftswissenshafen der DDR: *See*—
Banasiak, Lothar; Edlich, Wilfried; Lyr, Horst; Nega, Eva; and Sunkel, Marianne, 4,879,291, Cl. 514-237.800.
Institut Geotekhnicheskoj Mekhaniki: *See*—
Chervonenko, Alfred G.; Naduty, Vladimir P.; Morus, Vladimir L.; Kravchenko, Valery I.; and Lavrukhin, Viktor A., 4,879,024, Cl. 209-352.000.
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InterCon Systems, Inc.: *See*—
Neidich, Douglas A., 4,878,857, Cl. 439-599.000.
International Business Machines Corporation: *See*—
Arbel, Ygal, 4,879,745, Cl. 379-389.000.
Brodnax, Timothy B., 4,879,675, Cl. 364-738.000.
Fontana, Robert E., Jr.; Howard, James K.; Lee, James H.; and Lefakis, Haralambos, 4,879,619, Cl. 360-113.000.
Georgiou, Christos J.; Lien, Yeong-Chang L.; and Maruyama, Kiyoshi, 4,879,551, Cl. 340-825.870.
Gillett, John B.; Lohrey, Fred H.; and Lorenzen, Jerry A., 4,879,433, Cl. 174-32.000.
Herron, Lester W.; Lussow, Robert O.; Nufer, Robert W.; Schwartz, Bernard; Acocella, John; and Reddy, Srinivasa N., 4,879,156, Cl. 428-137.000.
Jove, Stephen A.; Klaassen, Klaas B.; Nomura, Calvin S.; and vanPeppen, Jacobus C. L., 4,879,610, Cl. 360-67.000.
Mabrouk, Saied A.; and Wheeler, Gerald L., 4,879,577, Cl. 355-208.000.
Masud, Charles R.; and Wu, Cheng-Teh, 4,878,290, Cl. 29-603.000.
Olsen, Floyd W., 4,879,661, Cl. 364-483.000.
International Flavors & Fragrances Inc.: *See*—
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International Fuel Cells Corporation: *See*—
Snopkowski, Daniel J., 4,879,189, Cl. 429-13.000.
International Research & Development Corporation: *See*—
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Intichar, Lutz, to Siemens Aktiengesellschaft. Circuit for monitoring a superconducting magnet winding. 4,879,622, Cl. 361-19.000.
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Schroder, Joris, 4,878,562, Cl. 187-127.000.
Invention Design Engineering Associates, Inc.: *See*—
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Foresta, Piero; Ghirardi, Orlando; Gabetta, Bruno; and Cristoni, Aldo, 4,879,376, Cl. 536-18.100.
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Isaacson, William C.; and Farmery, Herbert A., to Keen Corporation. Apparatus for slitting elongated flexible tape. 4,878,408, Cl. 83-444.000.
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Ise, Koichi, to Sony Corp. Optical low-pass filter. 4,878,737, Cl. 350-167.000.
Ise, Makoto; and Okino, Tadashi, to Canon Kabushiki Kaisha. Image sensing apparatus with control for varying the readout methodology. 4,879,600, Cl. 358-213.190.
Ishida, Yukio: *See*—
Tsunekawa, Yuzo; Ishida, Yukio; and Shiino, Tatsuo, 4,878,971, Cl. 156-70.000.
Ishigaki, Kunio; Takahashi, Toshiro; Mihara, Yuji; Adachi, Keiichi; Ohno, Shigeru; Okada, Masahiro; and Saeki, Naomi, to Fuji Photo Film Co., Ltd. Silver halide photographic element containing anhydazine compound and specific dyes. 4,879,204, Cl. 430-512.000.

Ishigami, Shinji: *See*—
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Ishiguro, Kazuyoshi: *See*—
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Ishihara, Koushi: *See*—
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Ishii, Hiroaki, to Omron Tateisi Electronics Co. Transaction processing apparatus having PLU function. 4,879,649, Cl. 364-405.000.
Ishii, Takayuki: *See*—
Ohkubo, Yukitoshi; Watanabe, Yasuyuki; Mochizuki, Chiori; Ishii, Takayuki; Yamanobe, Masato; and Ishiwata, Kazuya, 4,878,742, Cl. 350-347.00V.
Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See*—
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Ishimoto, Zenichi, to Nikko Co., Ltd. Apparatus for changing the running track of a racing toy. 4,878,876, Cl. 446-446.000.
Ishiwata, Kazuya: *See*—
Ohkubo, Yukitoshi; Watanabe, Yasuyuki; Mochizuki, Chiori; Ishii, Takayuki; Yamanobe, Masato; and Ishiwata, Kazuya, 4,878,742, Cl. 350-347.00V.
Ishiwata, Ken-ichi; Nakamura, Takeshi; Makiguchi, Nobuyoshi; Miyahara, Shoichiro; Matsumoto, Toshio; and Nitta, Kazunari, to Mitsui Toatsu Chemicals, Inc. Method for racemization of optically active serine. 4,879,411, Cl. 562-401.000.
Isobe, Mitsuo: *See*—
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Isobe, Toshiaki; and Oba, Hidehiro, to Toyota Jidosha Kabushiki Kaisha. Karman vortex sensor type flow rate measuring system. 4,878,386, Cl. 73-861.220.
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Meunier, Jean-Paul, deceased, 4,879,172, Cl. 428-280.000.
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Ito, Masahiko: *See*—
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Ito, Masazumi: *See*—
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Ito, Tetsuo: *See*—
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Ito, Yoshiyasu: *See*—
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Itoh, Akio, to Jeco Co., Ltd. Electrical indicator having an optical position encoder. 4,879,510, Cl. 324-150.000.
Itoh, Harumichi: *See*—
Motai, Hiroshi; Fukushima, Yaichi; Fukase, Tetsuro; and Itoh, Harumichi, 4,879,235, Cl. 435-225.000.
Itoh, Hirataka: *See*—
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Itoh, Yoshio: *See*—
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Itoi, Hiroshi: *See*—
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ITT Corporation: *See*—
Williams, Jack L., 4,878,880, Cl. 464-37.000.
ITW, Ltd.: *See*—
Hewison, George D., 4,878,793, Cl. 411-387.000.
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Jowsey, Clifford G., 4,878,302, Cl. 40-302.000.
Iversen, Robert E.: *See*—
Ostertag, Alfred; Iversen, Robert E.; Hyland, Craig R.; Enever, Kenneth D.; and Radford, Steven R., 4,878,548, Cl. 175-340.000.
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Suzuki, Yukio; Masuda, Ikuro; Iwamura, Masahiro; Kadono, Shinji; Uragami, Akiro; Yoshimura, Masayoshi; and Matsubara, Toshiaki, 4,879,480, Cl. 307-446.000.
Iwanaga, Kenji: *See*—
Taguchi, Jisei; Miura, Yutaka; Iwanaga, Kenji; and Tada, Manabu, 4,879,536, Cl. 335-128.000.
Iwasaki, Junichi; and Harigai, Hisao, to NEC Corporation. Data processing system with a pipelined structure for editing trace memory contents and tracing operations during system debugging. 4,879,646, Cl. 364-200.000.
Iwasaki, Kozo; Kuragano, Morimasa; Koshibe, Minoru; Sezaki, Yoshihiro; Yoguchi, Katsuji; and Koyama, Yoshio, to Mitsui Toatsu Chemicals, Inc.; and Kyowa Gas Chemical Industry Co., Ltd. Purification process of methacrylic acid. 4,879,412, Cl. 562-600.000.
Iwata, Hisami: *See*—
Horiki, Seinosuke; Makino, Reiji; and Iwata, Hisami, 4,879,158, Cl. 428-159.000.
Iwata, Masanari, to Mitsubishi Denki Kabushiki Kaisha. Industrial robot's articulate device. 4,879,499, Cl. 318-568.160.
Iwata, Toshiharu: *See*—
Hino, Yusuke; Horimoto, Tohru; Gemma, Hideaki; Iwata, Toshiharu; and Yamada, Kimitoshi, 4,879,550, Cl. 340-825.050.
Iwata, Tsutomu: *See*—
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Iwata, Yasuo: *See*—
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Iwatsubo, Masahito: *See*—
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Izumi, Hisashi: *See*—
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Izushi, Minetoshi: *See*—
Doi, Motomichi; Izushi, Minetoshi; Kawaike, Kazuhiko; and Urashin, Masayuki, 4,878,820, Cl. 418-203.000.
J & D Wilkie Limited: *See*—
Jeffrey, Robert F., 4,879,171, Cl. 428-259.000.
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Wason, Satish K., 4,879,058, Cl. 252-174.250.
Wason, Satish K., 4,879,323, Cl. 523-351.000.
Jabs, Gert: *See*—
Botta, Artur; and Jabs, Gert, 4,879,368, Cl. 528-397.000.
Jacanin, James M., Jr.; and Cardiff, Christopher H. Convertible snow clearing apparatus. 4,878,704, Cl. 294-54.500.
Jackson, Charmaine C.: *See*—
Seely, William B., Jr.; and Jackson, Charmaine C., 4,879,122, Cl. 426-102.000.
Jackson, James C.: *See*—
Brunfeldt, Robert J.; and Jackson, James C., 4,879,458, Cl. 250-288.000.
Jackson, Samuel D., to Imperial Chemical Industries, PLC. Effluent treatment. 4,879,047, Cl. 210-756.000.
Jacobs, Alvin J.; and Gordon, Gerald M., to General Electric Company. Treatment for inhibiting irradiation induced stress corrosion cracking in austenitic stainless steel. 4,878,962, Cl. 148-136.000.
Jaeger, Siegfried; and Herrlein, Wilhelm, to Lindauer Dornier Gesellschaft m.b.H. Gear drive for shuttleless looms. 4,878,392, Cl. 74-333.000.
Jager, Gerhard; Jautelat, Manfred; Kramer, Wolfgang; Buchel, Karl H.; Reinecke, Paul; Brandes, Wilhelm; Hanssler, Gerd; and Lurssen, Klaus, to Bayer Aktiengesellschaft. Fungicidal and plant-growth regulating azolyl ether ketones and alcohols. 4,878,939, Cl. 71-92.000.
James River II, Inc.: *See*—
Schutz, Rudolph W.; and Schultz, William, 4,879,150, Cl. 428-43.000.
Jamison, Chris M.; and Petersen, Eric A., to Ransburg Corporation. Peristaltic voltage block. 4,878,622, Cl. 239-690.100.
Janisch, Erich R., to Kunstoffe, Erich Janisch. Process for producing an electrically insulating sheathing around a junction between electrically conductive elements. 4,878,969, Cl. 156-49.000.
Jansons, Viktors; and Gors, Heinrich C., to Raychem Corporation. Preparation of aromatic oligomers. 4,879,366, Cl. 528-125.000.
Janssen Pharmaceutica N.V.: *See*—
De Bruyn, Marcel F. L.; Van Lommen, Guy R. E.; and Lutz, William R., 4,878,940, Cl. 71-92.000.
Janutta, Reinhard; Hartmann, Franz; and Hinzmann, Gerd, to Korber AG. Machine tool. 4,878,319, Cl. 51-271.000.
Japan Electronic Control Systems Co. Ltd.: *See*—
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Japan Tobacco Inc.: *See*—
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Japanese Research and Development Association for Bioreactor System, The: *See*—
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Jaworski, Robert J.: *See*—
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Jean, Marielle. Bathroom panel. 4,878,530, Cl. 160-211.000.
Jeco Co., Ltd.: *See*—
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Jeffrey, Robert F., to J & D Wilkie Limited. Thermal camouflage fabric. 4,879,171, Cl. 428-259.000.
Jeker, Rene: *See*—
Weber, Markus; Ryser, Andreas; and Jeker, Rene, 4,878,351, Cl. 62-51.100.
Weber, Markus; Ryser, Andreas; and Jeker, Rene , 4,878,352, Cl. 62-51.100.

Jennequin, Gerard: *See—*
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Jenoptik Jena GmbH: *See—*
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Jerman, John H., to Transensory Devices, Inc. Apparatus and method for forming fusible links. 4,879,587, Cl. 357-55.000.
Joffre, Paul F.: *See—*
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Johannessen, Birger, to Minnesota Mining and Manufacturing Company. Hydroxyl-terminated polyepichlorohydrin polymers. 4,879,419, Cl. 568-606.000.
Johansen, Laurie A.; and Diffendaffer, Paul, to Suntiger, Inc. Ultraviolet radiation and blue light blocking polarizing lens. 4,878,748, Cl. 351-44.000.
Johansson, Lennart, to BT Industries AB. Box handling apparatus. 4,878,798, Cl. 414-280.000.
John, Christian J.: *See—*
Webster, Charles; and John, Christian J., 4,878,589, Cl. 215-252.000.
Johnson, Cynthia L. Adjustable animal appearing toy. 4,878,872, Cl. 446-321.000.
Johnson, Darrel. Wood burning stove. 4,878,478, Cl. 126-61.000.
Johnson, Gary M.; and Nevill, Leland R., to Micron Technology, Inc. Short-resistant decoupling capacitor system for semiconductor circuits. 4,879,631, Cl. 361-386.000.
Johnson, Grannis S.; Grinstein, Reuben H.; Hartman, Stuart J.; and Dallago, Raymond P., to Henkel Corporation. Polythiols and use as epoxy resin curing agents. 4,879,414, Cl. 564-388.000.
Johnson, John W., to Chaldar, Inc. Seal-flushing in centrifugal-pumps, improved methods and apparatuses. 4,878,676, Cl. 277-24.000.
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Johnson, Kendrick A. Coffee carafe. 4,879,146, Cl. 428-35.700.
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Johnson, Marion; Hahn, Granville J.; and Ramoos, Ramiro V., to Permian Research Corporation. Composition for plastic article with unitarily molded foam layer. 4,879,138, Cl. 428-218.000.
Johnson, Marvin R.: *See—*
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Johnston, C. Lamar. Scene and verse coordinated medallion and card packaged together in a two pocketed transparent protective package. 4,878,580, Cl. 206-216.000.
Johnston, Daniel D. Shock resistant cellular fuel tank. 4,878,591, Cl. 220-22.000.
Johnston, Wilbur D., Jr.; and Tu, Charles W., to AT&T Bell Laboratories. Single crystal films of cubic group II fluorides on semiconductor compounds. 4,878,956, Cl. 148-33.300.
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Jones, Gregory D.; Owens, William R.; Thiel, Clifford G.; and Danby, Clive M., to Sundstrand Corporation. Power controller. 4,879,624, Cl. 361-65.000.
Jones, Timothy G. J.; and Hughes, Trevor L., to Schlumberger Technology Corporation. Method of monitoring the drilling operations by analyzing the circulating drilling mud. 4,878,382, Cl. 73-153.000.
Jonnalagadda, Krishnamurthy: *See—*
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Jorgensen, Stephen W., to United Technologies Corporation. Axial compressor blade assembly. 4,878,811, Cl. 416-215.000.
Joshi, Ashok V., to Ceramatec, Inc. Electrolyte assembly for oxygen generating device and electrodes therefor. 4,879,016, Cl. 204-242.000.
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Jove, Stephen A.; Klaassen, Klaas B.; Nomura, Calvin S.; and vanPeppen, Jacobus C. L., to International Business Machines Corporation. Protective circuit for a magnetoresistive element. 4,879,610, Cl. 360-67.000.
Jowsey, Clifford G., to ITW New Zealand Limited. Identification tag. 4,878,302, Cl. 40-302.000.
Jucha, Rhett B.; Davis, Cecil J.; Tang, Tom; and Loewenstein, Lee M., to Texas Instruments Incorporated. Method for etching titanium nitride local interconnects. 4,878,994, Cl. 156-643.000.
Judy, Millard M.; Matthews, James L.; Newman, Joseph T.; and Sogandares-Bernal, Franklin, to Baylor Research Foundation. Method for eradicating infectious biological contaminants in body tissues. 4,878,891, Cl. 604-5.000.
Juelich, Richard J.: *See—*
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Julien, Gerald J.; and Robinson, Steven P., to Boeing Company, The. Method and apparatus for sensing and damping vibration. 4,878,565, Cl. 188-378.000.
Julien, Paul C.: *See—*
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kabelmetal electro Gesellschaft mit beschrankter Haftung: *See—*
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Kagawa, Seiji, to Tonen Sekiyukagaku Kabushiki Kaisha. Method of producing a gas-permeable, waterproof composite sheet. 4,878,974, Cl. 156-85.000.
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Kaku, Toshimitsu; Tsunoda, Yoshito; and Shigematsu, Kazuo, to Hitachi, Ltd. Magneto-optic memory apparatus with defect detection of recording medium during erasing operation. 4,879,703, Cl. 369-13.000.
Kali-Chemie Pharma GmbH: *See—*
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Kamarei, Ahmad R.; Klibaner, Michael; and Peton, Denise, to Angio Medical Corporation. Method for enhancing or provoking angiogenesis using angiogenically active omega-3 polyunsaturated fatty acids. 4,879,312, Cl. 514-560.000.

Kamarei, Ahmad R.: *See*—
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Kamayachi, Yuzo, to Tensho Electric Industrial Co., Ltd. Massage unit. 4,878,489, Cl. 128-6.000.

Kambara, Hideki; and Nishikawa, Tetsuo, to Hitachi, Ltd. Method for reutilization of electrophoresis gel. 4,879,012, Cl. 204-157.150.

Kameda, Osamu, to Mazda Motor Corporation. Planetary sub-transmission. 4,878,399, Cl. 74-665.00T.

Kamiya, Takeshi: *See*—
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Kamiya, Tetsuro; Tsuchiya, Shuichi; and Hara, Kenji, to Kao Corporation. External medication for skin. 4,879,274, Cl. 514-12.000.

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Kanazawa University: *See*—
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Kaneda, Tokuzo, to Ricoh Company, Ltd. Image processing apparatus. 4,879,580, Cl. 355-295.000.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
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Kaneko, Katsutoshi; Kobayashi, Toshio; and Watari, Mitsuru, to Mitsui Petrochemical Industries, Ltd. Process for preparing two-ply foam molded articles. 4,878,972, Cl. 156-78.000.

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Kanemitsu, Yoichi, to Ebara Research Co., Ltd.; and Ebara Corporation. Controller for magnetic bearing system. 4,879,500, Cl. 318-632.000.

Kano, Yoshiaki: *See*—
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Karasawa, Hiroo; Kometani, Kiichi; and Okita, Kiyomi, to Toray Industries. Aromatic polyester composition and process for producing the same. 4,879,328, Cl. 524-109.000.

Karasin, Craig E.; and Thompson, Joseph, to Sterling Drug Inc. Valved dispensing applicator. 4,878,774, Cl. 401-15.000.

Karibe, Sonoko: *See*—
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Kasper, Gerhard; Wen, Horng-Yuan; and Nishikawa, Yukinobu, to American Air Liquide. Method for reducing pressure of highly compressed gases without generation of condensation droplets. 4,878,510, Cl. 137-1.000.

Kastelic, John R., to Shell Oil Company. Process for fluorinating linear alternating polyketone polymers and articles produced therefrom. 4,879,358, Cl. 525-539.000.

Katayama, Yoshio: *See*—
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Katus, Hugo: *See*—
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Katzin, Gerald H., to Ideation Enterprises, Inc. Injection site device having a safety shield. 4,878,897, Cl. 604-86.000.

Kaufman, Lance R. Direct bond circuit assembly with ground plane. 4,879,633, Cl. 361-386.000.

Kaufman, Rex A.: *See*—
Schoeff, Terry G.; and Kaufman, Rex A., 4,878,481, Cl. 126-307.00R.

Kaul, Bansi L., to Sandoz Ltd. 1-(dichloro-4'-sulfamoyl or substituted sulfamoyl-phenyazo)-2-hydroxy-3-phenylcarbamoyl or substituted phenylcarbamoyl-naphthalenes. 4,879,373, Cl. 534-864.000.

Kauss, Wolfgang, to Mannesmann Rexroth GmbH. Method for controlling an attachment to agricultural tractors. 4,878,543, Cl. 172-2.000.

Kawaguchi, Tsutomu: *See*—
Shimoda, Naoto; and Kawaguchi, Tsutomu, 4,879,272, Cl. 514-8.000.

Kawaike, Kazuhiko: *See*—
Doi, Motomichi; Izushi, Minetoshi; Kawaike, Kazuhiko; and Urashin, Masayuki, 4,878,820, Cl. 418-203.000.

Kawamura, Hideo, to Isuzu Motors Limited. Device for controlling turbocharger with electric rotary machine. 4,878,347, Cl. 60-608.000.

Kawamura, Katsumi: *See*—
Iida, Muneo; Honda, Masanobu; Kawamura, Katsumi; Daito, Hiroshi; Miyake, Yoshihiko; Setone, Shouichi; Takahashi, Hatsuo; and Nakanishi, Michihiro, 4,879,618, Cl. 360-106.000.

Kawamura, Masataka: *See*—
Shibato, Kishio; and Kawamura, Masataka, 4,879,337, Cl. 524-504.000.

Kawamura, Norimasa: *See*—
Makihara, Novuo; Ono, Hiroshi; and Kawamura, Norimasa, 4,878,865, Cl. 440-66.000.

Kawanishi, Hidenori; Yamaguchi, Masahiro; Hayashi, Hiroshi; Morimoto, Taiji; and Kaneiwa, Shinji, to Sharp Kabushiki Kaisha. Semiconductor laser device having extended facet life. 4,879,725, Cl. 372-48.000.

Kawano, Hitoshi; Hayashi, Mitsuhiro; Yamamoto, Yukio; and Ban, Kunikatsu, to N.P.W. Technical Laboratory Co.; and Shinko Electric Co., Ltd. Seam welding apparatus with edge detection. 4,879,445, Cl. 219-64.000.

Kawarabashi, Tsukasa, to Murata Kikai Kabushiki Kaisha. Two-for-one twisting machine. 4,878,342, Cl. 57-58.490.

Kawasaki Steel Corp.: *See*—
Yamaguchi, Yasuhiro; Shimoyama, Yuji; Ohnishi, Tateo; and Ohno, Hironobu, 4,878,961, Cl. 148-128.000.

Kawasato, Takayuki: *See*—
Sano, Yasuro; Koide, Akio; Hyodo, Toru; Kobayashi, Fumihiko; Kawasato, Takayuki; and Osanai, Yasuhiko, 4,878,444, Cl. 112-264.100.

Kawase, Tadamasa: *See*—
Senuma, Makoto; Kondoh, Shigeru; Kawase, Tadamasa; and Nakagawa, Yoshihiko, 4,879,118, Cl. 424-448.000.

Kawasumi Kagaku Kougiyou Kabushiki Kaisha: *See*—
Moriguchi, Soyao; Suzuki, Hiroshi; Watanabe, Hiroko; Satoh, Motoaki; Abe, Michio; and Iwata, Yasuo, 4,879,340, Cl. 525-54.200.

Kawata, Hiroitsu: *See*—
Konno, Yutaka; Kawata, Hiroitsu; Aruga, Masayoshi; Sonobe, Takashi; and Mitomi, Mitsuo, 4,879,119, Cl. 424-449.000.

Kawata, Osamu: *See*—
Yamada, Takeshi; Osato, Yasukuni; Watanabe, Okosu; Suzuki, Masao; Kawata, Osamu; and Ishihara, Koushi, 4,878,933, Cl. 65-29.000.

Kawatobi, Tatsuo: *See*—
Taniguchi, Hidenobu; and Kawatobi, Tatsuo, 4,879,742, Cl. 379-111.000.

Kaye, John A., to A and A Realty Company. Fireplace starter composition. 4,878,922, Cl. 44-502.000.

Kazahaya, Masahiro: *See*—
Valentin, Jean-Pascal; Maitre, Pierre; and Kazahaya, Masahiro, 4,879,450, Cl. 219-121.640.

Kazama, Shigenori: *See*—
Kimura, Hitoshi; Kazama, Shigenori; Shirasaka, Akitoshi; Taki, Kiyoshi; and Manabe, Yukihiro, 4,879,325, Cl. 523-404.000.

Kazlauskas, Romas J., to General Electric Company. Method for preparing optically active binaphthol and spiroibiindanol. 4,879,421, Cl. 568-737.000.

Kazui, Hidetaka; and Takano, Tomiyoshi, to Yoshida Kogyo K. K. Separable slide fastener. 4,878,275, Cl. 24-436.000.

Keen Corporation: *See*—
Isaacson, William C.; and Farmery, Herbert A., 4,878,408, Cl. 83-444.000.
Keep, Gerald T., to Eastman Kodak Company. Process of making fused, oriented-grain polymeric materials. 4,879,081, Cl. 264-101.000.
Kehrbach, Wolfgang: *See*—
Schoen, Uwe; Kehrbach, Wolfgang; Hachmeister, Bernd; Buschmann, Gerd; and Kuehl, Ulrich G., 4,879,299, Cl. 514-286.000.
Kelkar, Krishnanand: *See*—
Shumate, William A.; Kindred, Daniel R.; Antonio, Franklin P.; Gardner, Steven H.; Kelkar, Krishnanand; Bilotta, Thomas R.; and Rogers, Steven L., 4,879,720, Cl. 371-43.000.
Kelly, James H., to Pulaski Furniture Corporation. Memorialized case clocks. 4,879,701, Cl. 368-136.000.
Kembo, Nobumitsu, to Hitachi, Ltd. Information output device having data buffer for performing both character positioning and character expansion/compression. 4,879,666, Cl. 364-519.000.
Kendall, Jerry A.; and Webb, David M., to Elfab Corporation. Compliant electrical connector pin. 4,878,861, Cl. 439-751.000.
Kenney, James F.: *See*—
Sun, Robert L.; and Kenney, James F., 4,879,178, Cl. 428-355.000.
Kent Adhesive Products Co.: *See*—
Barnett, Charles J., 4,879,149, Cl. 428-41.000.
Kent, Alexander G., to BP Chemicals Limited. Production of formate salts. 4,879,070, Cl. 562-550.000.
Kent-Moore Corporation: *See*—
Dunham, Byron J.; Murray, Gary P.; and Bulla, Don A., 4,879,546, Cl. 340-632.000.
Punches, Robert J.; Murray, Gary P.; and Shirley, Roger D., 4,878,356, Cl. 62-149.000.
Kenworthy, Gordon; Mitchell, Colin H.; and Hawkins, Keith S., to National Nuclear Corporation Ltd. Liquid metal cooled nuclear reactors. 4,879,089, Cl. 376-399.000.
Kepplinger, Werner, to Deutsche Voest-Alpine Industrieanlagenbau GmbH. Process of dezincifying a material flow when operating a pig-iron production plant. 4,878,943, Cl. 75-25.000.
Ketterer, Scott R.: *See*—
Boudreau, Louis H.; and Ketterer, Scott R., 4,878,665, Cl. 273-34.00R.
Khan, Abdus S.: *See*—
Gostic, William J.; Khan, Abdus S.; and Murphy, Kenneth S., 4,878,965, Cl. 148-404.000.
Khanna, Pyare: *See*—
Weng, Litai; Calderhead, David; Khanna, Pyare; and Ullman, Edwin F., 4,879,215, Cl. 435-7.000.
Kida, Masaaki: *See*—
Sakata, Yoshitsugu; Hashidume, Kazunari; Iwata, Tsutomu; Mukai, Toyoharu; and Kida, Masaaki, 4,879,383, Cl. 544-37.000.
Kidani, Yoshinori; and Noji, Masahide, to Kidani, Yoshinori. Novel platinum-steroid complexes. 4,879,379, Cl. 540-3.000.
Kihara, Hiroyuki; and Mitaki, Kazuya, to Citizen Watch Co., Ltd. Sensor signal processor. 4,879,669, Cl. 364-550.000.
Kikuchi, Sei; Terauchi, Kiyoshi; Takai, Kazuhiko; and Higuchi, Teruo, to Sanden Corporation. Wobble plate type compressor with variable displacement mechanism. 4,878,817, Cl. 417-222.00S.
Kikuchi, Shunichi: *See*—
Yamamoto, Haruhiko; Suzuki, Masahiro; Udagawa, Yoshiaki; Nakata, Mitsuhiko; Katsuyama, Koji; Ono, Izumi; and Kikuchi, Shunichi, 4,879,632, Cl. 361-386.000.
Kikuda, Shigeru; and Miyamoto, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Dynamic random access memory having storage gate electrode grounding means. 4,879,679, Cl. 365-149.000.
Kikukawa, Yoshiiku; Nakasa, Masayuki; Yoshida, Tadahiro; Kitaura, Mashio; Nakai, Masaaki; Omaki, Takanobu; and Taniguchi, Nobuyuki, to Minolta Camera Kabushiki Kaisha. Camera system. 4,878,751, Cl. 354-410.000.
Kim, In S. Overload relay with adjustable threshold indicator. 4,879,626, Cl. 361-93.000.
Kimberly-Clark Corporation: *See*—
MacDonald, J. Gavin; and Nohr, Ronald S., 4,879,232, Cl. 435-179.000.
Radwanski, Fred R.; Trimble, Lloyd E.; Smith, Roland C.; and Connor, Linda A., 4,879,170, Cl. 428-233.000.
Kimura, Haruo: *See*—
Okada, Masao; Sakai, Kazuhiko; Kimura, Haruo; and Ikada, Yoshito, 4,878,907, Cl. 623-1.000.
Kimura, Hiroshi: *See*—
Hisajima, Masahiko; Kimura, Hiroshi; Shigemura, Yutaka; Yada, Isao; Irie, Yoichiro; Morimoto, Kiyoshi; and Nagashima, Takashi, 4,879,578, Cl. 355-234.000.
Kimura, Hitoshi; Kazama, Shigenori; Shirasaka, Akitoshi; Taki, Kiyoshi; and Manabe, Yukihiro, to Nissan Motor Co., Ltd.; and Shinto Paint Co., Ltd. Paint composition for cation electrodeposition painting. 4,879,325, Cl. 523-404.000.
Kimura, Junzo; and Nakao, Toshiyuki, to Aisin Seiki Kabushiki Kaisha. Bias ratio levelling apparatus of a worm gear type differential. 4,878,400, Cl. 74-715.000.
Kimura, Takashi; Kato, Takao; and Endo, Kazuo, to Kabushiki Kaisha Toshiba. Field-effect transistor. 4,879,582, Cl. 357-23.120.
Kimura, Toshiyuki: *See*—
Aoyagi, Yoshio; Hirano, Hiroyuki; Kimura, Toshiyuki; Niinuma, Susumu; Yoshioka, Minoru; Haeno, Akira; Sato, Takashi; Nishi, Yoshiro; Watanabe, Yoshihiko; Yokogawa, Fumihiko; Matsumoto, Keiichi; and Ogawa, Youichi, 4,879,705, Cl. 369-32.000.
Kindel, Leslie M.; and Rai, Iqbal S., to Motor Wheel Corporation. Wheel for a track laying vehicle. 4,878,716, Cl. 305-21.000.
Kindred, Daniel R.: *See*—
Shumate, William A.; Kindred, Daniel R.; Antonio, Franklin P.; Gardner, Steven H.; Kelkar, Krishnanand; Bilotta, Thomas R.; and Rogers, Steven L., 4,879,720, Cl. 371-43.000.
Kinetics Technology International: *See*—
Tsai, Frank W., 4,879,020, Cl. 208-130.000.
Kinney, Jerry N., to PPG Industries, Inc. Method of preparing an asbestos diaphragm. 4,879,009, Cl. 204-98.000.
Kinser, Ralph W., Jr.; Shriver, David L.; and Layman, Judith A., to Hewlett-Packard Company. Method of interconnecting assemblies using torsionly stressed conductors routed through a hollow articulated hinge. 4,878,293, Cl. 29-850.000.
Kinsman, Grant: *See*—
Duley, Walter W.; and Kinsman, Grant, 4,879,449, Cl. 219-121.600.
Kinukawa, Masahiko: *See*—
Nakano, Hiroshi; Takeuchi, Toyoaki; Tsunoda, Toshiyuki; and Kinukawa, Masahiko, 4,878,746, Cl. 350-507.000.
Kirby, Emery L., Jr. Object support for attachment to a cylindrically shaped support member. 4,878,642, Cl. 248-311.200.
Kisida, Hirosi: *See*—
Nishida, Sumio; Matsuo, Noritada; Hatakoshi, Makoto; and Kisida, Hirosi, 4,879,292, Cl. 514-241.000.
Kitabayashi, Masayuki; and Tanaka, Michio, to Bando Chemical Industries, Ltd. Toothed belt and power transmission device using the same. 4,878,886, Cl. 474-204.000.
Kitaguchi, Hiroshi; Izumi, Shigeru; and Suzuki, Satoshi, to Hitachi, Ltd. Semiconductor radiation detector. 4,879,466, Cl. 250-370.140.
Kitahara, Koichi: *See*—
Takagi, Yosuke; Ohata, Yu; Kitahara, Koichi; and Kuramoto, Tsuyoshi, 4,879,584, Cl. 357-43.000.
Kitaura, Mashio: *See*—
Kikukawa, Yoshiiku; Nakasa, Masayuki; Yoshida, Tadahiro; Kitaura, Mashio; Nakai, Masaaki; Omaki, Takanobu; and Taniguchi, Nobuyuki, 4,878,751, Cl. 354-410.000.
Kitazume, Masahiro: *See*—
Homma, Kazuya; Nogi, Hiroshi; Yamada, Koichi; Kitazume, Masahiro; Uzawa, Masamitsu; and Aoki, Makoto, 4,878,754, Cl. 356-376.000.
Kito, Tomohisa; Yabuta, Katsuhisa; and Hattori, Yoshinori, to NGK Spark Plug, Co., Ltd. Turbine rotor. 4,878,812, Cl. 416-241.00B.
Kitokovsky, Alexander P., to TRW Vehicle Safety Systems Inc. Tongue assembly. 4,878,271, Cl. 24-194.000.
Kiyosawa, Junichi, to Asics Corporation. Sports shoe. 4,878,301, Cl. 36-69.000.
Kizaki, Mikio: *See*—
Nagase, Masaomi; Ito, Yoshiyasu; Kizaki, Mikio; Matsuno, Kiyotaka; Tsukamoto, Keisuke; and Kobayashi, Fumiaki, 4,879,673, Cl. 364-571.010.
Klaassen, Klaas B.: *See*—
Jove, Stephen A.; Klaassen, Klaas B.; Nomura, Calvin S.; and vanPeppen, Jacobus C. L., 4,879,610, Cl. 360-67.000.
Klein, Gerhard: *See*—
Reiners, Jurgen; Podszun, Wolfgang; Winkel, Jens; Suling, Carlhans; and Klein, Gerhard, 4,879,402, Cl. 560-26.000.
Klein, Nathan: *See*—
Willer, Rodney L.; Cunkle, Glen T.; and Klein, Nathan, 4,878,968, Cl. 149-45.000.
Klemmer, Wolfram: *See*—
Eschelbach, Harald; and Klemmer, Wolfram, 4,879,593, Cl. 358-51.000.
Klesius, Phillip H.; and Cross, Debra A., to United States of America, Agriculture. In-vivo stimulation, collection, and modification of peritoneal macrophage. 4,878,895, Cl. 604-49.000.
Klibaner, Michael: *See*—
Kamarei, Ahmad R.; Klibaner, Michael; and Peton, Denise, 4,879,312, Cl. 514-560.000.
Klimov, Alexander S.: *See*—
Schadin, Lev V.; and Klimov, Alexander S., 4,878,983, Cl. 156-415.000.
Klinke, Christian: *See*—
Moser, Winfried; and Klinke, Christian, 4,878,381, Cl. 73-118.100.
Kljucaricek, Peter: *See*—
Fenoglio, Charles; Kljucaricek, Peter; Pernick, Jeffrey; and Schaedel, Fred C., 4,879,018, Cl. 204-56.100.
Knabenhans, Fritz: *See*—
Binder, Rolf; Staeheli, Paul; Staehli, Urs; and Knabenhans, Fritz, 4,878,784, Cl. 406-70.000.
Knapp, Alan G.; Lamport, Daphne L.; Washington, Derek; and Woodhead, Alfred W., to U.S. Philips Corporation. Display tube. 4,879,496, Cl. 315-366.000.
Knapp, John F.: *See*—
Gruber, Robert J.; Yourd, Raymond A., III; Julien, Paul C.; Knapp, John F.; and Bolte, Steven B., 4,879,199, Cl. 430-137.000.
Knerr, Michael P.: *See*—
Bowlin, William P.; Knerr, Michael P.; and Ballance, Jeffrey D., 4,879,659, Cl. 364-468.000.
Knighton, Nigel J.: *See*—
Storrow, Alan J.; and Knighton, Nigel J., 4,879,634, Cl. 361-388.000.
Knofel, Hartmut; Brockelt, Michael; Penninger, Stefan; and Stutz, Herbert, to Bayer Aktiengesellschaft. Cycloaliphatic diisocyanates optionally in the form of isomer mixtures and a process for their production. 4,879,408, Cl. 560-330.000.
Knofel, Hartmut; Brockelt, Michael; Penninger, Stefan; and Stutz, Herbert, to Bayer Aktiengesellschaft. Cycloaliphatic diisocyanates,

optionally in the form of isomeric mixtures and a process for their preparation. 4,879,409, Cl. 560-330.000.

Knudson, Robert M.; and Gnatowski, Marek J., to MacMillan Bloedel Limited. Chemically treated wood particle board. 4,879,083, Cl. 264-122.000.

Knudson, Robert M.; and Ehrenfellner, Hubert, to MacMillan Bloedel Limited. Edge stabilized wood composite panel. 4,879,160, Cl. 428-192.000.

Kobayashi, Fumiaki: *See*—
Nagase, Masaomi; Ito, Yoshiyasu; Kizaki, Mikio; Matsuno, Kiyotaka; Tsukamoto, Keisuke; and Kobayashi, Fumiaki, 4,879,673, Cl. 364-571.010.

Kobayashi, Fumihiko: *See*—
Sano, Yasuro; Koide, Akio; Hyodo, Toru; Kobayashi, Fumihiko; Kawasato, Takayuki; and Osanai, Yasuhiko, 4,878,444, Cl. 112-264.100.

Kobayashi, Hiromichi: *See*—
Miura, Kenichi; and Kobayashi, Hiromichi, 4,879,596, Cl. 358-88.000.

Kobayashi, Masaki; Itoh, Yoshio; and Kusaka, Hiroji, to Oki Electric Industry Co., Ltd.; and Kusaka, Hiroji. Spread spectrum communications system. 4,879,726, Cl. 375-1.000.

Kobayashi, Masanori, to Kuron Corporation. Electric blind. 4,878,528, Cl. 160-168.100.

Kobayashi, Nobuo: *See*—
Yamaguchi, Hidehiko; Minami, Kouichi; and Kobayashi, Nobuo, 4,878,873, Cl. 446-321.000.

Kobayashi, Osamu; and Yukimoto, Koji, to Kabushiki Kaisha Nippon Conlux. A coin separator having a projecting wall for augmenting the separation of coins of different diameters. 4,878,573, Cl. 194-338.000.

Kobayashi, Seizo: *See*—
Sano, Akira; Kobayashi, Seizo; Matsuura, Kazuo; Yokoyama, Shigeki; and Kamiya, Takeshi, 4,879,076, Cl. 264-28.000.

Kobayashi, Toshio: *See*—
Kaneko, Katsutoshi; Kobayashi, Toshio; and Watari, Mitsuru, 4,878,972, Cl. 156-78.000.

Kobayashi, Yoshinobu; Itou, Tosio; and Inoue, Takayuki, to Mitsubishi Petrochemical Co., Ltd. Polyphenylene ether resin composition. 4,879,360, Cl. 525-396.000.

Kober, Jurgen: *See*—
Brandenstein, Manfred; and Kober, Jurgen, 4,878,885, Cl. 474-135.000.

Kodai, Shiyojiro: *See*—
Ohashi, Masato; and Kodai, Shiyojiro, 4,879,153, Cl. 428-76.000.

Kodama, Tuneo: *See*—
Kurisu, Toru; and Kodama, Tuneo, 4,878,462, Cl. 123-90.170.

Koenitzer, Bernd A.: *See*—
Feimer, Joseph L.; Koenitzer, Bernd A.; and Schucker, Robert C., 4,879,044, Cl. 210-654.000.

Koga, Kunimasa; Fujikawa, Shigeaki; and Fukui, Yuko, to Suntory Limited. Natural blue dye composition and colorant using the same: prepared by reacting taurine and genipin. 4,878,921, Cl. 8-646.000.

Kogel, Henry G.: *See*—
Regan, James B.; Ikovich, George J.; Carlsen, James A.; Juelich, Richard J.; and Kogel, Henry G., 4,878,452, Cl. 114-293.000.

Kohl, Vance L.; and Schlosser, Charles E., to Manitowoc Company, The. Harvest cycle refrigerant control system. 4,878,361, Cl. 62-352.000.

Kohler Co.: *See*—
Grimstad, Ronald N.; and Daly, Michael F., 4,878,255, Cl. 4-236.000.

Kohler, Donald, to Wilfred Pavel Maschinenbau. Control device on a packaging machine for single or multiple packaging of hanging articles of clothing. 4,878,336, Cl. 53-500.000.

Kohler General Corp.: *See*—
Rosenthal, Bruce C.; Zill, Kevin L.; Claerbaut, Kevin R.; Berglund, David M.; and Grover, Kenneth L., 4,878,524, Cl. 144-356.000.

Kohmura, Isao; Senga, Takao; Furukawa, Akira; Yamamoto, Hirokazu; Nakatani, Mamoru; and Yamada, Jun, to Mitsubishi Paper Mills, Ltd. Method of developing electronic photograph with liquid developer and cleaning excess thereof. 4,879,197, Cl. 430-119.000.

Koide, Akio: *See*—
Sano, Yasuro; Koide, Akio; Hyodo, Toru; Kobayashi, Fumihiko; Kawasato, Takayuki; and Osanai, Yasuhiko, 4,878,444, Cl. 112-264.100.

Koike, Hitoshi, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Catalyst basket for denitration for use in an exhaust gas passage. 4,879,099, Cl. 422-177.000.

Koito Seisakusho Co., Ltd.: *See*—
Hirozumi, Yasuo; Kanematsu, Susumu; Numajiri, Yasuyoshi; Watanabe, Mikio; and Okano, Mitsuhiro, 4,879,491, Cl. 313-318.000.
Komatsu, Haruo; and Suzuki, Takashi, 4,878,391, Cl. 74-89.200.

Koizumi, Osamu: *See*—
Chamberlin, Davis W.; Leonard, Vurnen J.; and Koizumi, Osamu, 4,879,621, Cl. 360-133.000.

Koizumi, Satoru; Teshima, Daisuke; and Katayama, Yoshio, to Sharp Kabushiki Kaisha. Cassette tape recorder for multiple cassette tapes. 4,879,613, Cl. 360-92.000.

Kojima, Hisao. Apparatus for removing foreign substances in gas. 4,878,925, Cl. 55-235.000.

Kojima, Sadao, to Kaiyo Kogyo Kabushiki Kaisha. Local water cleaning method for use in consecutive water areas. 4,879,046, Cl. 210-747.000.

Kokuryo, Hitoshi: *See*—
Tamada, Masuo; Kokuryo, Hitoshi; Tamura, Shinsuke; and Ozaki, Hiroshi, 4,879,645, Cl. 364-200.000.

Koller Manufacturing Corporation: *See*—
Carroll, William M., 4,878,632, Cl. 242-199.000.

Komatsu, Haruo; and Suzuki, Takashi, to Koito Seisakusho Co., Ltd. Motion translating mechanism for use as a window regulator or the like. 4,878,391, Cl. 74-89.200.

Komatsu, Michiyasu: *See*—
Komeya, Katsutoshi; Hashimoto, Masahiro; Nishida, Katsutoshi; and Komatsu, Michiyasu, 4,879,263, Cl. 501-97.000.

Komatsu, Shigeru, to Kabushiki Kaisha Toshiba. Semiconductor device and a method of manufacturing the same. 4,879,252, Cl. 437-31.000.

Kometani, Kiichi: *See*—
Karasawa, Hiroo; Kometani, Kiichi; and Okita, Kiyomi, 4,879,328, Cl. 524-109.000.

Komeya, Katsutoshi; Hashimoto, Masahiro; Nishida, Katsutoshi; and Komatsu, Michiyasu, to Kabushiki Kaisha Toshiba. Sliding member of high strength and high abrasion resistance. 4,879,263, Cl. 501-97.000.

Kondo, Toshikatsu: *See*—
Ando, Takayuki; Ishiguro, Kazuyoshi; Matsui, Kenji; Yamashita, Tatsuo; and Kondo, Toshikatsu, 4,878,692, Cl. 280-804.000.

Kondo, Toshio, to Aisin Seiki Kabushiki Kaisha. Disc brake assembly. 4,878,564, Cl. 188-73.310.

Kondoh, Shigeru: *See*—
Senuma, Makoto; Kondoh, Shigeru; Kawase, Tadamasa; and Nakagawa, Yoshihiko, 4,879,118, Cl. 424-448.000.

Konica Corporation: *See*—
Ura, Hiroaki; and Shiozawa, Takao, 4,878,657, Cl. 271-9.000.
Yoshida, Kazuhiro; and Takamuki, Yasuhiko, 4,879,207, Cl. 430-564.000.

Konishi, Toshio: *See*—
Taniguchi, Kotaro; Konishi, Toshio; Shimura, Takehiko; Tanimoto, Shigekazu; and Nedzu, Shigeru, 4,879,085, Cl. 264-564.000.

Konishi, Yoshinori: *See*—
Sadaki, Hiroshi; Narita Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, 4,879,381, Cl. 540-222.000.

Konishiroku Photo Industry Co., Ltd.: *See*—
Niki, Hiroshi; Matsunawa, Masahiko; Yamamoto, Hiroyuki; and Abe, Yoshinori, 4,879,595, Cl. 358-80.000.

Konkol, Werner: *See*—
Bach, Hanswilhelm; Bahrmann, Helmut; Cornils, Boy; Gick, Wilhelm; Heim, Volker; Konkol, Werner; and Wiebus, Ernst, 4,879,418, Cl. 568-454.000.

Konno, Yutaka; Kawata, Hiroitsu; Aruga, Masayoshi; Sonobe, Takashi; and Mitomi, Mitsuo, to Yamanouchi Pharmaceutical Co., Ltd. Patch. 4,879,119, Cl. 424-449.000.

Kopp, Harold P.: *See*—
Bertsch, Jack E.; and Kopp, Harold P., 4,878,852, Cl. 439-103.000.

Kopper, Kenneth W.: *See*—
Levitt, Harry; Dugot, Richard S.; and Kopper, Kenneth W., 4,879,749, Cl. 381-68.400.

Korber AG: *See*—
Janutta, Reinhard; Hartmann, Franz; and Hinzmann, Gerd, 4,878,319, Cl. 51-271.000.
Pinck, Peter; Lorenzen, Heinz-Christen; Heitmann, Uwe; and Siems, Wolfgang, 4,878,506, Cl. 131-84.400.

Kordel, Jan: *See*—
Leonov, Mark; and Kordel, Jan, 4,878,376, Cl. 73-40.000.

Kornher, John S.; and Livak, Kenneth J., to Du Pont de Nemours, E. I., and Company. Differentiation of nucleic acid segments on the basis of nucleotide differences. 4,879,214, Cl. 08-10/89.000.

Korniski, Ronald J.: *See*—
Hilbert, Robert S.; and Korniski, Ronald J., 4,878,744, Cl. 350-447.000.

Korry Electronics Company: *See*—
Nelson, Leonard Y.; Green, John R.; and Wong, Carol W., 4,878,722, Cl. 350-96.200.

Koseki, Yasuo: *See*—
Kurokawa, Hideaki; Yamada, Akira; Koseki, Yasuo; Matsuzaki, Harumi; Ebara, Katsuya; Takahashi, Sankichi; Yoda, Hiroaki; Hayashi, Nobuatsu; Okouchi, Isao; Hishinuma, Yukio; and Momma, Naohiro, 4,879,041, Cl. 210-640.000.

Koshiba, Kenji: *See*—
Ogata, Taizo; Takahashi, Toyoharu; and Koshiba, Kenji, 4,878,982, Cl. 156-361.000.

Koshibe, Minoru: *See*—
Iwasaki, Kozo; Kuragano, Morimasa; Koshibe, Minoru; Sezaki, Yoshihiro; Yoguchi, Katsuji; and Koyama, Yoshio, 4,879,412, Cl. 562-600.000.

Koshiyouji, Takashi, to Kabushiki Kaisha Toshiba. Image reading apparatus. 4,879,604, Cl. 358-474.000.

Kosrow, Robert L.: *See*—
Adamski, Maximilian; Kosrow, Robert L.; and Ruderman, Stephen, 4,878,445, Cl. 112-311.000.

Kostelnicek, Richard J.; and Montes, Raul R., to Exxon Production Research Company. Method and apparatus for initiating seismic data storage in an isolated distributed recording system. 4,879,696, Cl. 367-76.000.

Kotikovsky, Alexander P.; and Tait, Robert E., to TRW Vehicle Safety Systems Inc. Tongue assembly. 4,878,272, Cl. 24-196.000.

Kovarik, David P.; and Amos, Michael D., to Erico International Corporation. Exothermic welding apparatus and method. 4,879,452, Cl. 219-130.400.

Koyama, Teruo: *See*—
Nakamura, Yoshiyuki; and Koyama, Teruo, 4,878,394, Cl. 74-493.000.

Koyama, Yoshio: *See*—
Iwasaki, Kozo; Kuragano, Morimasa; Koshibe, Minoru; Sezaki, Yoshihiro; Yoguchi, Katsuji; and Koyama, Yoshio, 4,879,412, Cl. 562-600.000.

Koyo Seiko Kabushiki Kaisha: *See*—
Nakamura, Yoshiyuki; and Koyama, Teruo, 4,878,394, Cl. 74-493.000.

Kozasa, Shizuo: *See*—
Umio, Suminori; Kozasa, Shizuo; and Yabuuchi, Takahiro, 4,879,301, Cl. 514-321.000.

Koziol, Jeffrey E.; and Peyman, Gholam A. Intraocular lens assembly. 4,878,910, Cl. 623-6.000.

Koziol, Kenneth J.: *See*—
Alam, Abu S.; Koziol, Kenneth J.; and Kapoor, John N., 4,879,286, Cl. 514-110.000.

Kozuki, Susumu; Takahashi, Koji; Satoh, Keiji; Nagasawa, Kenichi; Edakubo, Hiroo; and Otokawa, Mitsuhiro, to Canon Kabushiki Kaisha. Rotary head type recording apparatus having an erasing function based on recording mode. 4,879,609, Cl. 360-66.000.

Kramer, Wolfgang: *See*—
Jager, Gerhard; Jautelat, Manfred; Kramer, Wolfgang; Buchel, Karl H.; Reinecke, Paul; Brandes, Wilhelm; Hanssler, Gerd; and Lurssen, Klaus, 4,878,939, Cl. 71-92.000.

Kranz, Curt; and Anapliotis, Emmanuel, to Mecron medizinische Produkte GmbH. Modular assembly for a shaft prosthesis. 4,878,917, Cl. 623-18.000.

Krause, Hans: *See*—
Henneken, Bernhard; Kammerling, Bruno; Scholz, Eckhard-K.; Schroder, Wolfgang; and Krause, Hans, 4,878,655, Cl. 266-184.000.

Krauss, Mathias; and Schniek, Horst-Guenter, to Jenoptik Jena GmbH. Write-read circuit. 4,879,684, Cl. 365-189.110.

Kravchenko, Valery I.: *See*—
Chervonenko, Alfred G.; Naduty, Vladimir P.; Morus, Vladimir L.; Kravchenko, Valery I.; and Lavrukhin, Viktor A., 4,879,024, Cl. 209-352.000.

Kraz, Vladimir: *See*—
Young, Robert F.; and Kraz, Vladimir, 4,879,746, Cl. 379-399.000.

Kreko, James E.: *See*—
Toutant, Roy T.; Perry, David S.; Brennan, Michael A.; Kreko, James E.; and Dilk, Mark A., 4,878,368, Cl. 72-9.000.

Kress, Hans-Jurgen; Paul, Winfried; Peters, Horst; Lindner, Christian; and Buekers, Josef, to Bayer Aktiengesellschaft. Thermoplastic polycarbonate moulding compositions. 4,879,342, Cl. 525-67.000.

Krestyn, Karlheinz: *See*—
Spiegel, Nikolaus; Krestyn, Karlheinz; and Blaser, Theobald, 4,879,513, Cl. 324-207.000.

Kreyenberg, Heiner. Method and facility for removing sludge from water. 4,879,048, Cl. 210-768.000.

Kricka, Larry J.: *See*—
Whitehead, Thomas P.; Thorpe, Gary H. G. H.; Kricka, Larry J.; Gibbons, John E. C.; and Bunce, Roger A., 4,879,097, Cl. 422-67.000.

Krier, Gabriel: *See*—
Muller, Jean F.; Tollitte, Francois G.; Krier, Gabriel; Dominiak, Serge; Eberhardt, Andre; and Berveiller, Marcel, 4,879,467, Cl. 250-288.000.

Krisl, Matthew E.: *See*—
Gray, Howard R.; Shimshock, Richard P.; and Krisl, Matthew E., 4,879,140, Cl. 427-38.000.

Krivanek, Vaclav: *See*—
Puschel, Petr; Formanek, Zdenek; Krivanek, Vaclav; Pokorny, Antonin; Vlasakova, Anna; and Stuchikova, Alena, 4,879,246, Cl. 436-145.000.

Kroll, Mark W.; and Pommrehn, Mark R., to Cherne Medical, Inc. Optical fiber transmissive signal modulation system. 4,879,760, Cl. 455-605.000.

Kroman, Flemming: *See*—
Madsen, Erik; and Kroman, Flemming, 4,878,702, Cl. 292-307.000.

Kromrey, Robert V., to United Technologies Corporation. Process of high pressure curing with ultraviolet radiation. 4,879,073, Cl. 264-22.000.

Kroner, Karl-Heinz: *See*—
Cordes, Arno; Kula, Maria-Regina; Kroner, Karl-Heinz; and Stach, Wolfgang, 4,879,234, Cl. 435-189.000.

Krueger, Michael J. Projecting gun and nozzle. 4,878,621, Cl. 239-458.000.

Kruehler, Wolfgang; and Milla, Peter, to Siemens Aktiengesellschaft. Method of making series-connected, thin-film solar module formed of crystalline silicon. 4,879,251, Cl. 437-4.000.

Kruger, Michael, to Heidelberger Druckmaschinen AG. Procedure and circuit arrangement for switching on an inductance subject to remanence. 4,879,477, Cl. 307-239.000.

Krupp Polysius AG: *See*—
Unland, Georg, 4,878,949, Cl. 106-100.000.

Kubarych, Kenneth G.: *See*—
Hensley, John J.; Waldhelm, Christian M.; Tohill, Henry J.; and Kubarych, Kenneth G., 4,878,678, Cl. 277-235.00A.

Kubelik, Igor, to Delphax Systems. Multiple source charged particle generation. 4,879,569, Cl. 346-159.000.

Kubo, Kanji, to Honda Giken Kogyo Kabushiki Kaisha. Vehicle suspension system for a steerable wheel. 4,878,688, Cl. 280-693.000.

Kuch, Nina J. Process and apparatus for conveying information through motion sequences. 4,878,843, Cl. 434-112.000.

Kudo, Junichiro; and Shimizu, Yoshihiro, to Sony Corporation. Method for molding plastic material into disk shaped substrate for an optical information record carrier. 4,879,082, Cl. 264-106.000.

Kudomi, Mitsuharu: *See*—
Sometani, Taro; Takaoka, Naotoshi; Aida, Mitsuo; Kudomi, Mitsuharu; Tanahashi, Yasuhiro; and Aoki, Katsunori, 4,879,509, Cl. 324-108.000.

Kuehl, Ulrich G.: *See*—
Schoen, Uwe; Kehrbach, Wolfgang; Hachmeister, Bernd; Buschmann, Gerd; and Kuehl, Ulrich G., 4,879,299, Cl. 514-286.000.

Kueppers, Harald. Process for manufacturing systematic color tables or color charts for seven-color printing, and tables or charts produced by this process. 4,878,977, Cl. 156-264.000.

Kuhmichel, Philip A.: *See*—
Liu, Yuan K.; Kuhmichel, Philip A.; Cordes, Fred G.; and Wong, Wayman, 4,879,127, Cl. 426-325.000.

Kukes, Simon G.; Banks, Robert L.; and Harris, Jesse R., to Phillips Petroleum Company. Oligomerization of olefins. 4,879,425, Cl. 585-350.000.

Kula, Maria-Regina: *See*—
Cordes, Arno; Kula, Maria-Regina; Kroner, Karl-Heinz; and Stach, Wolfgang, 4,879,234, Cl. 435-189.000.

Kunstadter, Maria A. Closure device for nursing bra. 4,878,879, Cl. 450-36.000.

Kunstoffe, Erich Janisch: *See*—
Janisch, Erich R., 4,878,969, Cl. 156-49.000.

Kunz, Raymond: *See*—
Carlucci, Vito; and Kunz, Raymond, 4,879,443, Cl. 200-293.100.

Kuragano, Morimasa: *See*—
Iwasaki, Kozo; Kuragano, Morimasa; Koshibe, Minoru; Sezaki, Yoshihiro; Yoguchi, Katsuji; and Koyama, Yoshio, 4,879,412, Cl. 562-600.000.

Kuramoto, Tsuyoshi: *See*—
Takagi, Yosuke; Ohata, Yu; Kitahara, Koichi; and Kuramoto, Tsuyoshi, 4,879,584, Cl. 357-43.000.

Kurihara, Haruki: *See*—
Matsumoto, Kenji; and Kurihara, Haruki, 4,879,724, Cl. 372-46.000.

Kurihara, Kazumasa; Takahashi, Seiji; and Kaneko, Yoshio, to Nifco Inc. Expanding plastic fastener. 4,878,791, Cl. 411-55.000.

Kurimoto, Yukuo; and Endo, Takayoshi, to Tokyo Electric Co., Ltd. POS register system with combined optical scanner and weighing machine. 4,879,650, Cl. 364-405.000.

Kurisu, Toru; and Kodama, Tuneo, to Mazda Motor Corporation. Engine valve operating apparatus. 4,878,462, Cl. 123-90.170.

Kurka, Peter; and Goetze, Leppold, to Bayer Aktiengesellschaft. Agents for the prevention of ranking fights in pigs. 4,879,290, Cl. 514-223.200.

Kuroda, Takayuki: *See*—
Ohtake, Etsuo; Yamaki, Kaoru; and Kuroda, Takayuki, 4,878,973, Cl. 156-85.000.

Kurokawa, Hideaki; Yamada, Akira; Koseki, Yasuo; Matsuzaki, Harumi; Ebara, Katsuya; Takahashi, Sankichi; Yoda, Hiroaki; Hayashi, Nobuatsu; Okouchi, Isao; Hishinuma, Yukio; and Momma, Naohiro, to Hitachi, Ltd. Process for producing ultra-pure water and process for using said ultra-pure water. 4,879,041, Cl. 210-640.000.

Kurokawa, Naohiro; and Abe, Ryoichi, to Hitachi, Ltd. Programmable sequence controller with operation codes partially supplying jump to addresses of machine language instruction. 4,879,678, Cl. 364-900.000.

Kuroki, Yuzuru: *See*—
Takagi, Yuuji; Satoh, Isao; Ichinose, Makoto; Fukushima, Yoshihisa; and Kuroki, Yuzuru, 4,879,704, Cl. 369-14.000.

Kuron Corporation: *See*—
Kobayashi, Masanori, 4,878,528, Cl. 160-168.100.

Kusaka, Hiroji: *See*—
Kobayashi, Masaki; Itoh, Yoshio; and Kusaka, Hiroji, 4,879,726, Cl. 375-1.000.

Kusel Equipment Company: *See*—
Thomson, Meredith C., 4,879,129, Cl. 426-506.000.

Kutz, Johannes; and von Harten, Gunter, to Eduard Kusters Maschinenfabrik GmbH & Co. KG. Apparatus for continuous treatment of a textile web. 4,878,365, Cl. 68-9.000.

Kyocera Corporation: *See*—
Miwa, Takeru; and Noda, Iwao, 4,878,914, Cl. 623-16.000.
Takeda, Shigeki; and Takahashi, Akihiro, 4,879,563, Cl. 343-725.000.

Kyowa Gas Chemical Industry Co., Ltd.: *See*—
Iwasaki, Kozo; Kuragano, Morimasa; Koshibe, Minoru; Sezaki, Yoshihiro; Yoguchi, Katsuji; and Koyama, Yoshio, 4,879,412, Cl. 562-600.000.

Kyowa Hakko Kogyo Co., Ltd.: *See*—
Saito, Hiromitsu; Uosaki, Yoichi; Sato, Akira; Hirata, Tadashi; Morimoto, Makoto; and Ashizawa, Tadashi, 4,879,386, Cl. 544-343.000.

L&S Technologies, Inc.: *See*—
Singletary, Larry F., 4,878,307, Cl. 42-101.000.

La Jolla Cancer Research Foundation: *See*—
Rudslahti, Eric I.; Hayman, Edward G.; and Pierschbacher, Michael D., 4,879,237, Cl. 435-240.200.

La Souterraine S.A.: *See*—
Roche, Patrick, 4,879,557, Cl. 341-23.000.

La Telemecanique Electrique: *See*—
Dard, Pierre; and Maes, Fabrice, 4,879,437, Cl. 200-1.00R.
Leonard, Didier; Periot, Jean-Marie; and Petit, Pierre, 4,879,512, Cl. 324-207.000.

Lacey, Raymond D.: *See*—
Woodrow, Michael; and Lacey, Raymond D., 4,878,795, Cl. 411-501.000.

Lagoutte, Michele: *See*—
Vanlerberghe, Guy; Sebag, Henri; Lagoutte, Michele; and Grollier, Jean F., 4,879,107, Cl. 424-70.000.

L'air Liquide, Societe Anonyme pour l'etude et l'exploitation des Procedes Georges Claude: *See*—
Delatte, Daniel; and Simon, Bernard, 4,878,594, Cl. 220-254.000.

LaMarche, Jean-Luc, to i f m Electronic GmbH. Contact-free operating electronic switchgear. 4,879,474, Cl. 307-116.000.

Lamnabhi, Moustanir: *See*—
Salembier, Philippe; and Lamnabhi, Moustanir, 4,879,729, Cl. 375-104.000.

Lamport, Daphne L.: *See*—
Knapp, Alan G.; Lamport, Daphne L.; Washington, Derek; and Woodhead, Alfred W., 4,879,496, Cl. 315-366.000.

Land, Gerard; Maignan, Jean; Restle, Serge; and Malle, Gerard, to L'Oreal. Naphthalene derivatives having retinoid type action, the process for preparation thereof and medicinal and cosmetic compositions containing them. 4,879,284, Cl. 514-62.000.

Langberg, Edwin, to Sensor Electronics, Inc. Piezopolymer actuators. 4,879,698, Cl. 367-140.000.

Langley, Graham A.: *See*—
Franks, Nicholas; and Langley, Graham A., 4,879,751, Cl. 381-119.000.

Larkin, Stephen J., to Q-Bit Corporation. High gain RF amplifier with directional coupler feedback. 4,879,525, Cl. 330-294.000.

Larkins, David J.; and Schneider, John C., to Hydrochem Developments Ltd. Shut off seal about a shaft of a device having a side entry into a tank. 4,878,677, Cl. 277-105.000.

Laroche, Pierre, to Glaverbel. Articles of filled synthetic polymeric materials and glass bead filler therefor. 4,879,321, Cl. 523-203.000.

Larock, Richard C.; and Baker, Bruce E., to Iowa State University Research Foundation, Inc. Palladium-catalyzed arylation of cycloalkenes. 4,879,426, Cl. 585-469.000.

Larson, Clifford A.: *See*—
Van Tuyl, James E.; and Larson, Clifford A., 4,878,325, Cl. 52-217.000.

Laser Communications, Inc.: *See*—
Walter, Richard K., 4,879,764, Cl. 455-607.000.

Laser Magnetic Storage International Company: *See*—
Getreuer, Kurt W.; Verboom, Johannes J.; and Sonneville, Pierre R., 4,879,707, Cl. 369-46.000.
Getreuer, Kurt W.; and Verboom, Johannes J., 4,879,708, Cl. 369-46.000.
Lee, Wai-Won, 4,879,706, Cl. 369-45.000.

Laskowski, Donald R.; and Tekulve, Daniel R., to Laskowski Enterprises, Inc. Band saw wheel. 4,878,411, Cl. 83-820.000.

Laskowski Enterprises, Inc.: *See*—
Laskowski, Donald R.; and Tekulve, Daniel R., 4,878,411, Cl. 83-820.000.

Lassiaz, Philippe: *See*—
Gay, Christian; and Lassiaz, Philippe, 4,878,572, Cl. 192-98.000.

Latassa, Frank M.; and Wilson, William E., to North American Philips Corp. Fluorescent lamp having a multi-layer phosphor optimized for lumen output, color rendering and cost. 4,879,492, Cl. 313-487.000.

Latella, Anthony; and Casciani, Robert V., to Sandoz Ltd. Ether sulfates of a mixture of branched 1-decanols. 4,879,399, Cl. 558-34.000.

Latham, Craig V.: *See*—
Wear, Boyd A.; Latham, Craig V.; and Priser, James A., 4,878,533, Cl. 164-16.000.

Lattice Semiconductor Corporation: *See*—
Turner, John E.; Rutledge, David L.; and Darling, Roy D., 4,879,688, Cl. 365-201.000.

Laurent, Sebastian M.; and Sanders, Robert N., to Ethyl Corporation. Zeolites in poultry feeding. 4,879,121, Cl. 426-2.000.

Lausberg, Dietrich; Seiler, Erhard; and Braun, Hans-Georg, to BASF Aktiengesellschaft. Thermoplastic molding compositions based on polycarbonates, polyesters and polyamides. 4,879,324, Cl. 523-400.000.

Lautner, Max; Hoffman, Fred; and Melnikov, Edward, to Uppco Inc. Methods of assembling electric motors with reduced end-play. 4,878,289, Cl. 29-596.000.

Lavrukhin, Viktor A.: *See*—
Chervonenko, Alfred G.; Naduty, Vladimir P.; Morus, Vladimir L.; Kravchenko, Valery I.; and Lavrukhin, Viktor A., 4,879,024, Cl. 209-352.000.

Lawrence, James, to Sanders Associates, Inc. Carriage coupling device system for pen plotter. 4,879,567, Cl. 346-139.00R.

Layman, Judith A.: *See*—
Kinser, Ralph W., Jr.; Shriver, David L.; and Layman, Judith A., 4,878,293, Cl. 29-850.000.

Lea, Richard H.: *See*—
van Laar, Hermanus G.; Lea, Richard H.; and Payne, Beverley, 4,879,014, Cl. 204-190.000.

Leclercq, Jacques: *See*—
Letemps, Bernard; Huchet, Gerard; and Leclercq, Jacques, 4,878,850, Cl. 439-83.000.

Leduc, Edward C.: *See*—
Schubert, John C.; and Leduc, Edward C., 4,878,970, Cl. 156-69.000.

Lee, David M. Center collapsible transport cart. 4,878,682, Cl. 280-42.000.

Lee, Hee-Yong, to Dae Ryung Vacumm Co. Ltd. Multi-rod type magnetron sputtering apparatus. 4,879,017, Cl. 204-298.000.

Lee, James H.: *See*—
Fontana, Robert E., Jr.; Howard, James K.; Lee, James H.; and Lefakis, Haralambos, 4,879,619, Cl. 360-113.000.

Lee, Norman C., to Zarn, Inc. Apparatus for segregated refuse collection. 4,878,592, Cl. 220-23.830.

Lee, Wai-Won, to Laser Magnetic Storage International Company. Method and apparatus for focus and tracking in an optical disk system. 4,879,706, Cl. 369-45.000.

Lees, Thomas: *See*—
Berding, Josef; Bertling, Hannes; Lees, Thomas; and Pabst, Carsten, 4,878,519, Cl. 138-31.000.

Lefakis, Haralambos: *See*—
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Lehr, Gary L.: *See*—
Harrison, John R.; Lehr, Gary L.; Parr, Dennis J.; Ward, William F., Jr.; and Wells, Robert R., 4,878,407, Cl. 83-13.000.

Lehr, Lothar: *See*—
Debus, Jurgen; and Lehr, Lothar, 4,878,777, Cl. 403-205.000.

Leighton, Frank T.; and Micali, Silvio. Method and system for personal identification. 4,879,747, Cl. 380-23.000.

Leighton, Harry J.: *See*—
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Leland Stanford Junion University, The Board of Trustees of the: *See*—
Reynolds, Scott K.; Vook, Dietrich W.; and Gibbons, James F., 4,879,259, Cl. 437-247.000.

Lemle, Eugene W. Recumbent bicycle. 4,878,684, Cl. 280-288.100.

Lennon, Archie A., to Ingersoll-Rand Company. Rock drilling apparatus. 4,878,547, Cl. 175-53.000.

Lennon, Dan C. Bicycle, handlebar and adapter system. 4,878,397, Cl. 74-551.100.

Leon, Robert L., to Liberty Technology Center, Inc. Flat, multiconductor cable coil device for in situ detecting of axial motion of a generally cylindrical member. 4,879,511, Cl. 324-163.000.

Leonard, Didier; Periot, Jean-Marie; and Petit, Pierre, to La Telemecanique Electrique. Circuit for processing a pseudo-oscillatory signal, especially for inductive proximity detectors. 4,879,512, Cl. 324-207.000.

Leonard, Vurnen J.: *See*—
Chamberlin, Davis W.; Leonard, Vurnen J.; and Koizumi, Osamu, 4,879,621, Cl. 360-133.000.

Leonhardt, Wolfgang: *See*—
Dankowski, Manfred; Lieser, Thomas; Prescher, Gunter; Leonhardt, Wolfgang; and Diehl, Manfred, 4,879,057, Cl. 252-99.000.

Leonov, Mark; and Kordel, Jan, to Intel Corporation. Method and apparatus for testing sputter targets. 4,878,376, Cl. 73-40.000.

Less Micanik Inc.: *See*—
Lessard, Michel, 4,878,607, Cl. 226-24.000.

Lessard, Michel, to Less Micanik Inc. Apparatus for unreeling a cable. 4,878,607, Cl. 226-24.000.

Letemps, Bernard; Huchet, Gerard; and Leclercq, Jacques, to Saint-Gobain Vitrage. Electric power supply terminal for encapsulated glazing. 4,878,850, Cl. 439-83.000.

Leuthold, Karl; Maul: Herbert; Troger, Walter; and Serester, Alexander, to GAO Gesellschaft fur Automation und Organisation mbH. Apparatus for destroying banknotes. 4,878,626, Cl. 241-57.000.

Leutner, Bernd: *See*—
Hoppe, Klaus-Dieter; Leutner, Bernd; and Schreiner, Siegfried, 4,879,102, Cl. 423-235.000.

Level 1 Technologies: *See*—
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Levin, Horst: *See*—
Schroth, Volkmar; and Levin, Horst, 4,879,529, Cl. 331-14.000.

Levitt, Harry; Dugot, Richard S.; and Kopper, Kenneth W., to Audimax, Inc. Host controller for programmable digital hearing aid system. 4,879,749, Cl. 381-68.400.

Leybold Aktiengesellschaft: *See*—
Siegmund, Hans-Joachim; and Schwiecker, Horst, 4,878,755, Cl. 356-382.000.

Liao, Hsieh-Yuan. Electric screwdriver. 4,878,404, Cl. 81-54.000.

Liberty Technology Center, Inc.: *See*—
Leon, Robert L., 4,879,511, Cl. 324-163.000.

Lich, Richard L.; and Siewert, Robert L., to Trackmobile, Inc. Railcar moving vehicle. 4,878,436, Cl. 105-72.200.

Lien, Yeong-Chang L.: *See*—
Georgiou, Christos J.; Lien, Yeong-Chang L.; and Maruyama, Kiyoshi, 4,879,551, Cl. 340-825.870.

Lieser, Thomas: *See*—
Dankowski, Manfred; Lieser, Thomas; Prescher, Gunter; Leonhardt, Wolfgang; and Diehl, Manfred, 4,879,057, Cl. 252-99.000.

Light, Ronald R.; and Seymour, Robert W., to Eastman Kodak. Compatible tricomponent polymer blends. 4,879,355, Cl. 525-439.000.

Lindauer Dornier Gesellschaft m.b.H.: *See*—
Jaeger, Siegfried; and Herrlein, Wilhelm, 4,878,392, Cl. 74-333.000.

Lindblom, Boris: *See*—
Tengstrand, Gorand; Lindblom, Boris; Nilsson, Jerry; and Lunden, Peter, 4,878,561, Cl. 181-188.000.

Lindemann, Peer; and Haughton, Victor M., to Servetus Partnership. Endoprosthesis for repairing a damaged vessel. 4,878,906, Cl. 623-1.000.

Lindmayer, Joseph, to Quantex Corporation. Photoluminescent materials for outputting reddish-orange light and a process for making the same. 4,879,186, Cl. 428-691.000.

Lindner, Christian: *See*—
Kress, Hans-Jurgen; Paul, Winfried; Peters, Horst; Lindner, Christian; and Buekers, Josef, 4,879,342, Cl. 525-67.000.
Lindsay, Tom E.; and Smith, James C., to Lindsay, Tom E. Device for encouraging children to brush their teeth regularly. 4,878,845, Cl. 434-238.000.
Lion Corporation: *See*—
Shibasaki, Ken-ichiro; Itoi, Hiroshi; Ohkubo, Shouichi; and Sano, Hiroshi, 4,879,281, Cl. 514-55.000.
Lipscomb, N. Thornton; and Buazza, Omar M., to Ophthalmic Research Group International, Inc. Plastic lens composition and method for the production thereof. 4,879,318, Cl. 522-42.000.
Liquid Carbonic Corporation: *See*—
Tyree, Lewis, Jr., 4,878,362, Cl. 62-381.000.
List, Steven J.; and Hurst, Ronald C., to Cabot Corporation. Process for producing carbon black. 4,879,104, Cl. 423-450.000.
Little, Robert E., Jr. Game point scoring and analyzing device. 4,879,651, Cl. 364-411.000.
Littlewood, Morgan. Communications switch. 4,879,712, Cl. 370-60.000.
Liu, Frank, to Unisource Corp. Fax/telephone switching device. 4,879,741, Cl. 379-100.000.
Liu, Geng-tao: *See*—
Chen, Yen-rong; Yang, Ming-he; Huang, Liang; Liu, Geng-tao; and Benz, Ulrich, 4,879,390, Cl. 548-453.000.
Liu, Jia-ming: *See*—
Chen, Ying C.; Liu, Jia-ming; and Newkirk, Michael A., 4,878,723, Cl. 350-96.140.
Liu, Yuan K.; Kuhmichel, Philip A.; Cordes, Fred G.; and Wong, Wayman, to Del Monte Corporation. Method of preserving produce for further processing. 4,879,127, Cl. 426-325.000.
Livak, Kenneth J.: *See*—
Kornher, John S.; and Livak, Kenneth J., 4,879,214, Cl. 08-10/89.000.
Livny, Izhak M.: *See*—
Hekker, Roeland M. T.; and Livny, Izhak M., 4,878,736, Cl. 350-162.130.
Lloyd, David J.: *See*—
Aldred, Edward J.; and Lloyd, David J., 4,878,338, Cl. 56-7.000.
Lloyd, Sheldon G., to Fisher Controls International, Inc. Differential pressure sensing apparatus. 4,878,385, Cl. 73-704.000.
Lo, Sunny J.; and Snow, Steven A., to Dow Corning Corporation. Method of boosting foam in low sudsing detergents with zwitterionic polysiloxane. 4,879,051, Cl. 252-8.750.
Loesel, Georg: *See*—
Tratz, Herbert; Riedle, Klaus; and Loesel, Georg, 4,878,440, Cl. 110-233.000.
Loewenstein, Lee M.: *See*—
Jucha, Rhett B.; Davis, Cecil J.; Tang, Tom; and Loewenstein, Lee M., 4,878,994, Cl. 156-643.000.
Lohmeijer, Johannes H. G. M.: *See*—
De Munck, Johannes W. J.; and Lohmeijer, Johannes H. G. M., 4,879,330, Cl. 524-151.000.
Lohr & Bromkamp GmbH: *See*—
Welschof, Hans-Heinrich; and Schwarzler, Peter, 4,878,882, Cl. 464-144.000.
Lohrey, Fred H.: *See*—
Gillett, John B.; Lohrey, Fred H.; and Lorenzen, Jerry A., 4,879,433, Cl. 174-32.000.
Lombardi, Massimo: *See*—
Santandrea, Luciano; and Lombardi, Massimo, 4,878,292, Cl. 29-734.000.
Lonardi, Emile, to Paul Wurth S.A. Method and apparatus for correcting the falling path in a loading installation of a shaft furnace. 4,878,797, Cl. 414-161.000.
Londino, Joseph M., Jr., to United States of America, Navy. Apparatus and method for locating the axis of symmetry (center of circular cross section) of three dimensional objects. 4,878,296, Cl. 33-227.000.
Long, Michael E., to Eastman Kodak Company. Ultrasonic dye image fusing. 4,879,564, Cl. 346-25.000.
Lonza Ltd.: *See*—
Meul, Thomas, 4,879,393, Cl. 548-544.000.
LookingGlass Technology, Inc.: *See*—
Vilums, Ivars J., 4,878,735, Cl. 350-131.000.
Looser, Siegfrid: *See*—
Hallermayer, Klaus; Looser, Siegfrid; and Katus, Hugo, 4,879,216, Cl. 435-7.000.
Lopez, Emile: *See*—
Demangeon, Francis; and Lopez, Emile, 4,879,326, Cl. 524-61.000.
L'Oreal: *See*—
Land, Gerard; Maignan, Jean; Restle, Serge; and Malle, Gerard, 4,879,284, Cl. 514-62.000.
Vanlerberghe, Guy; Sebag, Henri; Lagoutte, Michele; and Grollier, Jean F., 4,879,107, Cl. 424-70.000.
Lorensen, William E.: *See*—
Cline, Harvey E.; Ludke, Siegwalt; and Lorensen, William E., 4,879,668, Cl. 364-522.000.
Lorenzen, Heinz-Christen: *See*—
Pinck, Peter; Lorenzen, Heinz-Christen; Heitmann, Uwe; and Siems, Wolfgang, 4,878,506, Cl. 131-84.400.
Lorenzen, Jerry A.: *See*—
Gillett, John B.; Lohrey, Fred H.; and Lorenzen, Jerry A., 4,879,433, Cl. 174-32.000.
Losi, Salvatore A., to Givaudan Corporation. Fluid evaporating devices. 4,878,615, Cl. 239-45.000.
Loughlin, Bernard D., to Hazeltine Corp. Tweet elimination, or reduction, in superheterodyne receivers. 4,879,757, Cl. 455-182.000.
Loughlin, Patrick J.; Westenskow, Dwayne R.; Wied, Henrich A.; and Wallroth, Carl-Friedrich, to Dragerwerk Aktiengesellschaft. Method for simulating and demonstrating the gas exchange during mandatory or assisted ventilation and apparatus therefor. 4,878,388, Cl. 73-866.400.
Louis A. Grant, Inc.: *See*—
Grant, Louis A., 4,878,789, Cl. 409-143.000.
Louis, Bernard: *See*—
Bichot, Bernard; and Louis, Bernard, 4,879,444, Cl. 219-10.55A.
LoVasco, Francis; and Oien, Michael A., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Process for controlling solder joint geometry when surface mounting a leadless integrated circuit package on a substrate. 4,878,611, Cl. 228-180.200.
Lowrance, Darrell J.; and Weber, Ronald G., to Lowrance Electronics, Inc. Sonar fish finder apparatus providing split-screen display. 4,879,697, Cl. 367-111.000.
Lowrance Electronics, Inc.: *See*—
Lowrance, Darrell J.; and Weber, Ronald G., 4,879,697, Cl. 367-111.000.
LSI Logic Corporation: *See*—
Patrick, Roger, 4,879,257, Cl. 437-195.000.
Lubrizol Corporation, The: *See*—
Clark, Alan C.; Richards, Edward P.; and Shaw, Douglas R., 4,879,022, Cl. 209-166.000.
Lucas, Adrian D.: *See*—
Apps, Howard R.; Lucas, Adrian D.; and Fairhall, Philip C., 4,878,369, Cl. 72-12.000.
Lucasey Manufacturing Company, Inc.: *See*—
O'Neill, Edward L., 4,878,645, Cl. 248-680.000.
Luce, Robert G.; McCoy, Daniel F.; Merriman, Floyd C.; and Gregurech, Steve, to United States of America, Energy. Neutron economic reactivity control system for light water reactors. 4,879,086, Cl. 376-173.000.
Luckett, Dirk R.; and Parkerson, James P., to Texas Instruments Incorporated. Multi-slave master-slave flip-flop. 4,879,680, Cl. 365-154.000.
Ludden, Richard. Method for etching a bar code on metal. 4,879,457, Cl. 235-487.000.
Ludke, Siegwalt: *See*—
Cline, Harvey E.; Ludke, Siegwalt; and Lorensen, William E., 4,879,668, Cl. 364-522.000.
Lukasiewicz, Robert F., to Ram Golf Corporation. Golf club with swing speed indicator. 4,878,672, Cl. 273-186.00A.
Lum, Beverly Y.: *See*—
Halverson, Danny C.; Lum, Beverly Y.; and Munir, Zuhair A., 4,879,262, Cl. 501-87.000.
Lunden, Peter: *See*—
Tengstrand, Gorand; Lindblom, Boris; Nilsson, Jerry; and Lunden, Peter, 4,878,561, Cl. 181-188.000.
Lundsgaard, Jorgen S., to MHB Joint Venture. Electrochemical cell. 4,879,190, Cl. 429-94.000.
Lupo, Anthony C., to Sunny's Waterbeds & Accessories, Inc. Waterbed pedestal wrap. 4,878,259, Cl. 5-451.000.
Luquette, Michael M., to Innovative Therapeutic Designs, Inc. Direct drive rehabilitation and fitness apparatus and method of construction. 4,878,663, Cl. 272-134.000.
Lurssen, Klaus: *See*—
Jager, Gerhard; Jautelat, Manfred; Kramer, Wolfgang; Buchel, Karl H.; Reinecke, Paul; Brandes, Wilhelm; Hanssler, Gerd; and Lurssen, Klaus, 4,878,939, Cl. 71-92.000.
Luschnig, Franz: *See*—
Stritzl, Karl; Luschnig, Franz; Riegler, Andreas; Wurthner, Hubert; and Freisinger, Henry, 4,878,687, Cl. 280-605.000.
Lussow, Robert O.: *See*—
Herron, Lester W.; Lussow, Robert O.; Nufer, Robert W.; Schwartz, Bernard; Acocella, John; and Reddy, Srinivasa N., 4,879,156, Cl. 428-137.000.
Lutz, William R.: *See*—
De Bruyn, Marcel F. L.; Van Lommen, Guy R. E.; and Lutz, William R., 4,878,940, Cl. 71-92.000.
Lyerly, David M.: *See*—
Wilkins, Tracy D.; and Lyerly, David M., 4,879,218, Cl. 435-7.000.
Lymburner, Robert K. Proximity switch for a cylinder. 4,879,440, Cl. 200-82.00R.
Lynch, Michael B. Burner illuminator device. 4,878,832, Cl. 431-120.000.
Lynn, Scott: *See*—
Hanson, Donald N.; and Lynn, Scott, 4,879,042, Cl. 210-642.000.
Lyphomed, Inc.: *See*—
Alam, Abu S.; Koziol, Kenneth J.; and Kapoor, John N., 4,879,286, Cl. 514-110.000.
Alam, Abu S.; Joshi, Utpal G.; Mehta, Jairaj U.; Sayeed, Fakrul A. A.; and Kapoor, John N., 4,879,308, Cl. 514-509.000.
Lyr, Horst: *See*—
Banasiak, Lothar; Edlich, Wilfried; Lyr, Horst; Nega, Eva; and Sunkel, Marianne, 4,879,291, Cl. 514-237.800.
M/A-Com Government Systems, Inc.: *See*—
Shumate, William A.; Kindred, Daniel R.; Antonio, Franklin P.; Gardner, Steven H.; Kelkar, Krishnanand; Bilotta, Thomas R.; and Rogers, Steven L., 4,879,720, Cl. 371-43.000.
M. Fabrikant & Sons, Inc.: *See*—
Freilich, Joseph A., 4,878,364, Cl. 63-28.000.
M.G.S. Japan Co., Ltd.: *See*—
Mitsuhashi, Yoshio, 4,878,608, Cl. 227-120.000.

Mabrouk, Saied A.; and Wheeler, Gerald L., to International Business Machines Corporation. Method and apparatus for controlling the electrostatic parameters of an electrophotographic reproduction device. 4,879,577, Cl. 355-208.000.

Mac Engineering & Equipment Company, Inc.: *See—*
Fredrickson, Roy A., 4,878,521, Cl. 141-1.100.

MacCline, Billy: *See—*
Shaw, Danial G.; and MacCline, Billy, 4,878,546, Cl. 173-163.000.

MacDonald, J. Gavin; and Nohr, Ronald S., to Kimberly-Clark Corporation. Multilayered structure containing immobilized blud-green algae. 4,879,232, Cl. 435-179.000.

Machida Endoscope Co., Ltd.: *See—*
Miyagi, Kunihiko, 4,878,484, Cl. 128-4.000.

Machida, Yoshio: *See—*
Suzuki, Hirokazu; Machida, Yoshio; and Yuasa, Yuji, 4,878,499, Cl. 128-653.00A.

Machin, Francis. Conservatory construction. 4,878,330, Cl. 52-475.000.

Machnig, Helmut: *See—*
Plank, Friedrich W.; Machnig, Helmut; Mischke, Georg H.; Friedrichs, Reinhard; and Nahrmann, Norbert, 4,878,623, Cl. 241-5.000.

MacIntyre, Alan D., to Ball Corporation. Method and apparatus for determining the time between two signals. 4,879,700, Cl. 368-117.000.

MacKay, Joseph H., Jr. Pressure cap for disposable finishing article. 4,878,316, Cl. 51-168.000.

MacMillan Bloedel Limited: *See—*
Aune, Jan E.; Arden, Terence J.; and Yap, Mary S., 4,879,752, Cl. 382-1.000.
Knudson, Robert M.; and Gnatowski, Marek J., 4,879,083, Cl. 264-122.000.
Knudson, Robert M.; and Ehrenfellner, Hubert, 4,879,160, Cl. 428-192.000.

Madsen, Erik; and Kroman, Flemming, to emc-tamaco a/s. Method, a binder and a binding machine for closing hose or bag shaped packings, primarily tubular foodstuff packings. 4,878,702, Cl. 292-307.000.

Maeda, Yoshinori: *See—*
Okamoto, Tadashi; Kadota, Hiroshi; Miyake, Jiro; Okabayashi, Ichiro; and Maeda, Yoshinori, 4,879,687, Cl. 365-200.000.

Maeno, Kazutoshi, to NEC Corporation. Channel assignment system for loop network. 4,879,714, Cl. 370-85.700.

Maes, Fabrice: *See—*
Dard, Pierre; and Maes, Fabrice, 4,879,437, Cl. 200-1.00R.

Maetani, Masami: *See—*
Onuki, Kazuhiko; Maetani, Masami; Ito, Masahiko; and Murata, Shinji, 4,879,572, Cl. 355-45.000.

Magarian, Robert A.; and Pento, Joseph T., to University of Oklahoma, The Board of Regents for the. Cyclopropyl analogs as anti-estrogenic, anti-tumor and female fertility agents. 4,879,315, Cl. 514-754.000.

Magnavox Government and Industrial Electronics Company: *See—*
Richeson, William E., Jr.; and Erickson, Frederick L., 4,878,464, Cl. 123-90.110.

Mahjour, Majid; Mauser, Bernadette E.; and Fawzi, Mahdi B., to Warner-Lambert Company. Fatty acids and their small chain esters as penetration enhancers in aqueous systems. 4,879,297, Cl. 514-282.000.

Maignan, Jean: *See—*
Land, Gerard; Maignan, Jean; Restle, Serge; and Malle, Gerard, 4,879,284, Cl. 514-62.000.

Maitre, Pierre: *See—*
Valentin, Jean-Pascal; Maitre, Pierre; and Kazahaya, Masahiro, 4,879,450, Cl. 219-121.640.

Majco Building Specialites, L.P.: *See—*
Schoeff, Terry G.; and Kaufman, Rex A., 4,878,481, Cl. 126-307.00R.

Major, Mihaly: *See—*
Fischer, Janos; Dobay, Laszlo ; Major, Mihaly; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Hajos, Gyorgy; and Szporny, Laszlo , 4,879,404, Cl. 560-051.000.

Major, Robert D.: *See—*
West, Philip B.; Major, Robert D.; and Fuerstenberg, Gary D., 4,878,273, Cl. 24-289.000.

Maki, Melvin C.; and Feller, Walter J., to Control Data Canada Limited. Intrusion detection system 4,879,544, Cl. 340-552.000.

Makiguchi, Nobuyoshi: *See—*
Ishiwata, Ken-ichi; Nakamura, Takeshi; Makiguchi, Nobuyoshi; Miyahara, Shoichiro; Matsumoto, Toshio; and Nitta, Kazunari, 4,879,411, Cl. 562-401.000.

Makihara, Novuo; Ono, Hiroshi; and Kawamura, Norimasa, to Nissan Motor Co., Ltd. Outboard propulsion unit supporting system for boat. 4,878,865, Cl. 440-66.000.

Makino, Reiji: *See—*
Horiki, Seinosuke; Makino, Reiji; and Iwata, Hisami, 4,879,158, Cl. 428-159.000.

Malcmacher, Louis J.; and Gross, Jeffrey S. Apparatus and method for preparing teeth for crown or bridge work or other dental work. 4,878,842, Cl. 433-72.000.

Maliszewski, Charles R.: *See—*
Cerretti, Douglas P.; Davis, Brian S.; and Maliszewski, Charles R., 4,879,374, Cl. 536-27.000.

Malka, Jacob H.; and Ahern, Glenn J., to Allied-Signal Inc. Servo loop processor in association with a central processing unit for closed loop control of a servo system. 4,879,642, Cl. 364-131.000.

Mallaghan, Michael L., to Powerscreen International Limited. Conveyor assembly. 4,879,023, Cl. 209-241.000.

Malle, Gerard: *See—*
Land, Gerard; Maignan, Jean; Restle, Serge; and Malle, Gerard, 4,879,284, Cl. 514-62.000.

Man Gutehoffnungshuette, GmbH: *See—*
Henneken, Bernhard; Kammerling, Bruno; Scholz, Eckhard-K.; Schroder, Wolfgang; and Krause, Hans, 4,878,655, Cl. 266-184.000.

MAN Technologie GmbH: *See—*
Nestmeier, Johannes, 4,878,753, Cl. 356-237.000.

Manabe, Yukihiro: *See—*
Kimura, Hitoshi; Kazama, Shigenori; Shirasaka, Akitoshi; Taki, Kiyoshi; and Manabe, Yukihiro, 4,879,325, Cl. 523-404.000.

Manchester R & D Partnership: *See—*
Fergason, James L., 4,878,741, Cl. 350-339.00F.

Mandell, Gerald D. Travel accessory. 4,878,359, Cl. 62-239.000.

Manitowoc Company, The: *See—*
Kohl, Vance L.; and Schlosser, Charles E., 4,878,361, Cl. 62-352.000.

Mannesmann Rexroth GmbH: *See—*
Kauss, Wolfgang, 4,878,543, Cl. 172-2.000.

Mannheim, Jose R. Method to manufacture a blindaged glass. 4,879,183, Cl. 428-437.000.

Manning, Francis S.: *See—*
Sublette, Kerry L.; Woolsey, Maron E.; Manning, Francis S.; Montgomery, Anne D.; and McInerney, Michael J., 4,879,240, Cl. 435-252.100.

Manning, William R., to Champion Spark Plug. Alumina-zirconia ceramic. 4,879,260, Cl. 501-32.000.

Manniso, James L.; Sieber, Eugene W.; and Voshell, Glenn R., to W. L. Gore & Associates, Inc. Filter cartridge. 4,878,930, Cl. 55-493.000.

Mannschke, Lothar P., to U.S. Philips Corporation. Multilayer integrated optical device. 4,878,728, Cl. 350-96.170.

Manschitz, Erwin: *See—*
Plank, Uto; Neumaier, Anton; and Manschitz, Erwin, 4,878,679, Cl. 279-19.400.

Manufacture d'Appareillage Electrique de Cahors: *See—*
Bourrieres, Pierre, 4,878,984, Cl. 156-431.000.

Manville Corporation: *See—*
Schuster, Richard L., 4,878,612, Cl. 229-40.000.

Mapletoft, Reuben J.: *See—*
Silversides, David W.; Mapletoft, Reuben J.; Murphy, Bruce D.; and Misra, Virkam, 4,879,112, Cl. 424-85.900.

Marabella, Charles P., to Minnesota Mining and Manufacturing Company. Device for exposing colorant to be transferred. 4,879,174, Cl. 428-321.500.

Marburger, Heinz: *See—*
Birkert, Karl; and Marburger, Heinz, 4,878,423, Cl. 99-332.000.

Marcinko, Richard M.: *See—*
Woo, James T. K.; Reising, John C.; Marcinko, Richard M.; and Miles, David E., 4,879,344, Cl. 525-100.000.

Marconi Company Limited, The: *See—*
Bramley, David F., 4,878,752, Cl. 356-152.000.

Margraf, Adolf. Filtering separator for particles and harmful gases from unrefined gases. 4,878,927, Cl. 55-302.000.

Marie, Christian: *See—*
Brion, Francis; Buendia, Jean; and Marie, Christian, 4,879,392, Cl. 548-492.000.

Marienbach, Edouard: *See—*
Wraight, Peter D.; Marienbach, Edouard; Hache, Jean-Michel; Rhein-Knudsen, Erik; and Evans, Mike, 4,879,463, Cl. 250-270.000.

Marier, Gregory J.; and Moats, Tommy O., to Yamaha Hatsudoki Kabushiki Kaisha. Power lawn mower with selectively deployable riding platform. 4,878,339, Cl. 56-14.700.

Marion Laboratories, Inc.: *See—*
Zobrist, Ray H.; and Morrone, William R., 4,879,289, Cl. 514-211.000.

Markusch, Peter H.; Mason, Arthur W.; and Wenzel, Wolfgang D., to Mobay Corporation. Continuous process for the production of aqueous polyurethane urea dispersions. 4,879,322, Cl. 523-322.000.

Markwardt, Herbert W., to Encon Industries, Inc. Dual mounting ceiling fan. 4,878,806, Cl. 416-5.000.

Marmonier, Andre : *See—*
Heng, Jean-Paul; Marmonier, Andre ; and Briguet, Etienne, 4,878,855, Cl. 439-411.000.

Marsella, Louis J.: *See—*
Newman, Frederick C.; and Marsella, Louis J., 4,879,147, Cl. 428-35.000.

Marshall, David B.; De Wames, Roger E.; Morgan, Peter E. D.; and Ratto, Joseph J., to Rockwell International Corporation. Magnetic suspension and magnetic field concentration using superconductors. 4,879,537, Cl. 335-216.000.

Marshall, Michael L.: *See—*
Wood-Rethwill, Julianne C.; Jaworski, Robert J.; Myers, E. Gary; and Marshall, Michael L., 4,879,063, Cl. 252-370.000.

Martens, Franciscus J. A., to Shell Oil Company. Ceramic burner for partial oxidation of a hydrocarbon-containing fuel. 4,878,835, Cl. 431-187.000.

Martin, Graham E.; Cockshott, Ian D.; and Fildes, Francis J. T., to Imperial Chemical Industries PLC. Fibrillar product. 4,878,908, Cl. 623-1.000.

Martin Marietta Corporation: *See—*
Frazier, Claude C.; Guha, Shekhar; and Chen, Wenpeng, 4,879,479, Cl. 307-425.000.

Martt, Judson F.: *See—*
Watkins, Donald M.; Huggett, Tryon V.; and Martt, Judson F., 4,878,551, Cl. 177-139.000.

Maruta, Syuzi; and Ito, Masazumi, to Minolta Camera Kabushiki Kaisha. Copying apparatus with provision for delayed reset in the event of paper exhaustion. 4,879,575, Cl. 355-208.000.

Maruyama, Kiyoshi: *See—*
Georgiou, Christos J.; Lien, Yeong-Chang L.; and Maruyama, Kiyoshi, 4,879,551, Cl. 340-825.870.

Marvin Glass & Associates: *See—*
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Maschinenfabrik Sulzer-Burckhardt AG: *See—*
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Mason, Arthur W.: *See—*
Markusch, Peter H.; Mason, Arthur W.; and Wenzel, Wolfgang D., 4,879,322, Cl. 523-322.000.

Mastuno, Hiromistu; Murayama, Seiichi; Ono, Tetsuo; and Watanabe, Yoshio, to Hitachi, Ltd. Low-pressure discharge lamp. 4,879,493, Cl. 313-641.000.

Masud, Charles R.; and Wu, Cheng-Teh, to International Business Machines Corporation. Method for making thin film magnetic head. 4,878,290, Cl. 29-603.000.

Masuda, Ikuro: *See—*
Suzuki, Yukio; Masuda, Ikuro; Iwamura, Masahiro; Kadono, Shinji; Uragami, Akiro; Yoshimura, Masayoshi; and Matsubara, Toshiaki, 4,879,480, Cl. 307-446.000.

Masuda, Katsuhiko: *See—*
Hamada, Tetsuro; Masuda, Katsuhiko; Shibuya, Kazunori; Shimada, Kazuhiko; Fujii, Etsuo; Ikegami, Hiroshi; and Furuya, Kunitaka, 4,878,566, Cl. 192-13.00R.

Masuda, Yasuo; Takahashi, Tsutomu; Takizawa, Yoshio; and Yoshiki, Naokazu, to Mitsubishi Kinzoku Kabushiki Kaisha. Heat transfer material. 4,879,185, Cl. 428-687.000.

Mathieu, Bernd, to Fresenius AG. Arrangement for peritoneal dialysis and connector therefore. 4,878,516, Cl. 137-240.000.

Matsubara, Toshiaki: *See—*
Suzuki, Yukio; Masuda, Ikuro; Iwamura, Masahiro; Kadono, Shinji; Uragami, Akiro; Yoshimura, Masayoshi; and Matsubara, Toshiaki, 4,879,480, Cl. 307-446.000.

Matsuda, Shinpei: *See—*
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Matsui, Kenji: *See—*
Ando, Takayuki; Ishiguro, Kazuyoshi; Matsui, Kenji; Yamashita, Tatsuo; and Kondo, Toshikatsu, 4,878,692, Cl. 280-804.000.

Matsuki, Yuji: *See—*
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Matsukuma, Kanemasa: *See—*
Fujio, Yoshiharu; Matsukuma, Kanemasa; and Nishimoto, Toshihiko, 4,879,363, Cl. 526-314.000.

Matsumoto, Hiroo: *See—*
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Matsumoto, Katsuya: *See—*
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Matsumoto, Keiichi: *See—*
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Matsumoto, Kenji; and Kurihara, Haruki, to Kabushiki Kaisha Toshiba. Semiconductor laser. 4,879,724, Cl. 372-46.000.

Matsumoto, Takenori: *See—*
Asakura, Koichi; Demura, Makoto; and Matsumoto, Takenori, 4,879,660, Cl. 364-474.150.

Matsumoto, Takeshi; Oyamada, Takashi; and Hayasaka, Sigeki, to NEC Corporation. Holding structure for a paging receiver having extra functions. 4,879,759, Cl. 455-348.000.

Matsumoto, Toshio: *See—*
Ishiwata, Ken-ichi; Nakamura, Takeshi; Makiguchi, Nobuyoshi; Miyahara, Shoichiro; Matsumoto, Toshio; and Nitta, Kazunari, 4,879,411, Cl. 562-401.000.

Matsunaga, Nobuyuki: *See—*
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Matsunawa, Masahiko: *See—*
Niki, Hiroshi; Matsunawa, Masahiko; Yamamoto, Hiroyuki; and Abe, Yoshinori, 4,879,595, Cl. 358-80.000.

Matsuno, Kiyotaka: *See—*
Nagase, Masaomi; Ito, Yoshiyasu; Kizaki, Mikio; Matsuno, Kiyotaka; Tsukamoto, Keisuke; and Kobayashi, Fumiaki, 4,879,673, Cl. 364-571.010.

Matsuo, Noritada: *See—*
Nishida, Sumio; Matsuo, Noritada; Hatakoshi, Makoto; and Kisida, Hirosi, 4,879,292, Cl. 514-241.000.

Matsuoka, Kazushige, to Omron Tateisi Electronics Co. Connection arrangement between control device and signal transmission device. 4,878,860, Cl. 439-716.000.

Matsushita Electric Industrial Co., Ltd.: *See—*
Okamoto, Tadashi; Kadota, Hiroshi; Miyake, Jiro; Okabayashi, Ichiro; and Maeda, Yoshinori, 4,879,687, Cl. 365-200.000.
Tadashi, Kunihira; and Minakuchi, Hiroshi, 4,879,754, Cl. 388-810.000.
Takagi, Yuuji; Satoh, Isao; Ichinose, Makoto; Fukushima, Yoshihisa; and Kuroki, Yuzuru, 4,879,704, Cl. 369-14.000.

Matsushita Electric Works, Ltd.: *See—*
Mori, Tamotsu; and Yasuda, Makoto, 4,879,535, Cl. 335-14.000.

Matsuura, Kazuo: *See—*
Sano, Akira; Kobayashi, Seizo; Matsuura, Kazuo; Yokoyama, Shigeki; and Kamiya, Takeshi, 4,879,076, Cl. 264-28.000.

Matsuzaka, Eiichi: *See—*
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Matsuzaki, Harumi: *See—*
Kurokawa, Hideaki; Yamada, Akira; Koseki, Yasuo; Matsuzaki, Harumi; Ebara, Katsuya; Takahashi, Sankichi; Yoda, Hiroaki; Hayashi, Nobuatsu; Okouchi, Isao; Hishinuma, Yukio; and Momma, Naohiro, 4,879,041, Cl. 210-640.000.

Mattfeld, Johann, to Telefunken electronic GmbH. Integrated complementary push-pull B final stage. 4,879,522, Cl. 330-263.000.

Matthews, James L.: *See—*
Judy, Millard M.; Matthews, James L.; Newman, Joseph T.; and Sogandares-Bernal, Franklin, 4,878,891, Cl. 604-5.000.

Matthews, Leonard A.; Powers, William J., III; Przybyla, Henry M.; Whittle, Joanne R.; and Perciful, Jerry C., to Texaco Inc. Process for preparing overbased calcium sulfonates. 4,879,053, Cl. 252-25.000.

Matuz, Judit: *See—*
Fischer, Janos; Dobay, Laszlo ; Major, Mihaly; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Hajos, Gyorgy; and Szporny, Laszlo , 4,879,404, Cl. 560-051.000.

Matzner, Markus: *See—*
Harris, James E.; Matzner, Markus; and Robeson, Lloyd M., 4,879,354, Cl. 525-425.000.

Maul: Herbert: *See—*
Leuthold, Karl; Maul: Herbert; Troger, Walter; and Serester, Alexander, 4,878,626, Cl. 241-57.000.

Maurel, Christian: *See—*
Boucard, Michel; Thirion, Christian; and Maurel, Christian, 4,879,630, Cl. 361-386.000.

Mauser, Bernadette E.: *See—*
Mahjour, Majid; Mauser, Bernadette E.; and Fawzi, Mahdi B., 4,879,297, Cl. 514-282.000.

Mavilor Systemes S.A.: *See—*
Tassinario, Giampiero, 4,879,485, Cl. 310-156.000.

Maxconn Incorporated: *See—*
Maxwell, Jack A., 4,878,856, Cl. 439-540.000.

Maxfield, MacRae; Baughman, Ray H.; Igbal, Zafar; and Eckhardt, Helmut, to Allied-Signal Inc. Method of forming superconducting ceramics by electrodeposition. 4,879,270, Cl. 505-1.000.

Maxwell, Jack A., to Maxconn Incorporated. Bracketed stacking of multi-pin connectors. 4,878,856, Cl. 439-540.000.

Mays, Thomas D.; and Dally, Ellen L., to IGI Biotechnology, Inc. Microbial production of polyfructose. 4,879,228, Cl. 435-101.000.

Mazda Motor Corporation: *See—*
Kameda, Osamu, 4,878,399, Cl. 74-665.00T.
Kurisu, Toru; and Kodama, Tuneo, 4,878,462, Cl. 123-90.170.
Uchida, Hiroyasu; and Ueda, Kazuhiko, 4,878,460, Cl. 123-52.0MV.

Mazumder, Ali T., to NCR Corporation. Ribbon feed control apparatus and method. 4,878,773, Cl. 400-234.000.

McClellan, Bingham A.: *See—*
Hannon, Douglas; and McClellan, Bingham A., 4,878,310, Cl. 43-42.040.

McClellan Industries, Inc.: *See—*
Hannon, Douglas; and McClellan, Bingham A., 4,878,310, Cl. 43-42.040.

McCoy, Daniel F.: *See—*
Luce, Robert G.; McCoy, Daniel F.; Merriman, Floyd C.; and Gregurech, Steve, 4,879,086, Cl. 376-173.000.

McCulloch, Christopher A. G.; and Birek, Peter. Periodontal probe. 4,878,841, Cl. 433-72.000.

McCullough, Francis P., Jr.; Hale, Frank W.; Snelgrove, R. Vernon; and Hall, David M., to Dow Chemical Company, The. Flame retarding and fire blocking fiber blends. 4,879,168, Cl. 428-224.000.

McCullough, Nancy J.; Schukman, Jacob E.; and Powers, Phillip G., to General Foods Corporation. Universal cereal puffing apparatus. 4,878,422, Cl. 99-323.400.

McDonald, Ian A.; Palfreyman, Michael G.; and Collard, Jean-Noel, to Merrell Dow Pharmaceuticals. Use of β-(fluoromethylene)-5-hydroxytryptophan and derivatives as prodrugs and mao inhibition. 4,879,305, Cl. 514-419.000.

McDonald, Walter; and Seitel, Norbert J., to Norwalt Design, Inc. Vibratory feeder for elastomeric components. 4,878,575, Cl. 198-391.000.

McGee, Frank J.: *See—*
Hsu, Chien-Yeh; McGee, Frank J.; and Banks, Roger L., 4,878,278, Cl. 28-142.000.

McGee, James E. Protective eyewear with interchangeable decorative frames. 4,878,749, Cl. 351-52.000.

McGilvray, Donald A., III. Exercise snorkel apparatus. 4,878,491, Cl. 128-201.110.

McHenry, Mark A., to Northrop Corporation. Radar test device with rotator inside subject-support fixture. 4,879,560, Cl. 342-165.000.

McInerney, Michael J.: *See—*
Sublette, Kerry L.; Woolsey, Maron E.; Manning, Francis S.; Montgomery, Anne D.; and McInerney, Michael J., 4,879,240, Cl. 435-252.100.

McIntyre, Robert F.: *See—*
Morgan, Alton C., Jr.; Woodhouse, Clive S.; and McIntyre, Robert F., 4,879,225, Cl. 435-68.000.

McLane, Jack S. Barbeque grill with flameless heating element and heat restrictive cooking surface. 4,878,477, Cl. 126-41.00R.
McLean, Howard J., to United Technologies Corporation. Augmentor liner construction. 4,878,283, Cl. 29-163.600.
McLellan, Gordon; and Wright, Diane G. Memorial flag display and storage case. 4,879,145, Cl. 428-14.000.
McNally, Lance; Booth, Anthony J.; and Morley, Peter S., to BULL HN Information Systems Inc. Resilient data communications system. 4,879,716, Cl. 371-8.200.
McSherry, Thomas W.; and Garfield, Nathaniel H., to Mechanical Plastics Corp. Expansible fastening element. 4,878,790, Cl. 411-34.000.
McVey, Michael J., to Hughes Aircraft Company. Digital switching voltage regulator having telescoped regulation windows. 4,879,504, Cl. 323-272.000.
Mead Corporation, The: *See*—
Beery, Jack, 4,878,581, Cl. 206-416.000.
Meadows, Alan, to Coal Industry (Patents) Limited. Method of locating a member in a borehole. 4,879,695, Cl. 367-25.000.
Measurex Corporation: *See*—
Dahlquist, John A., 4,879,471, Cl. 250-359.100.
Mechanical Plastics Corp.: *See*—
McSherry, Thomas W.; and Garfield, Nathaniel H., 4,878,790, Cl. 411-34.000.
Mecron medizinische Produkte GmbH: *See*—
Kranz, Curt; and Anapliotis, Emmanuel, 4,878,917, Cl. 623-18.000.
Mehdizadeh, Mehrdad; Patrick, John L.; and Misic, George J., to Picker International, Inc. Precision electrical adjustment of quadrature coil isolation. 4,879,516, Cl. 324-318.000.
Mehlkopf, Antoon F.; and Den Boef, Johannes H., to U.S. Philips Corporation. Magnetic resonance imaging device comprising a digital transmitter/receiver. 4,879,514, Cl. 324-309.000.
Mehta, Jairaj U.: *See*—
Alam, Abu S.; Joshi, Utpal G.; Mehta, Jairaj U.; Sayeed, Fakrul A. A.; and Kapoor, John N., 4,879,308, Cl. 514-509.000.
Meinhold, Henner; Ziegenbein, Botho; and Petri, Gunther, to BBC Brown Boveri Aktiengesellschaft. Bypass element for safeguarding battery cells. 4,879,188, Cl. 429-7.000.
Meister, Alton, to Cornell Research Foundation, Inc. Glutathione delivery system. 4,879,370, Cl. 530-331.000.
Melnikov, Edward: *See*—
Lautner, Max; Hoffman, Fred; and Melnikov, Edward, 4,878,289, Cl. 29-596.000.
Mercer, Frank W.; Froix, Michael F.; and Cheng, Tai C., to Raychem Corporation. Poly(aryl ether ketone) compositions. 4,879,338, Cl. 524-508.000.
Merger, Franz; Frank, Juergen; Vagi, Uwe; and Fischer, Rolf, to BASF Aktiengesellschaft. Preparation of pentenoic esters from formylvaleric esters. 4,879,406, Cl. 560-211.000.
Merger, Franz: *See*—
Naeumann, Fritz; Hoelderich, Wolfgang; and Merger, Franz, 4,879,405, Cl. 560-211.000.
Merrell Dow Pharmaceuticals: *See*—
McDonald, Ian A.; Palfreyman, Michael G.; and Collard, Jean-Noel, 4,879,305, Cl. 514-419.000.
Merrifield, Robert B., to Rockefeller University, The. Glucagon homologs and therapeutic use thereof. 4,879,273, Cl. 514-12.000.
Merriman, Floyd C.: *See*—
Luce, Robert G.; McCoy, Daniel F.; Merriman, Floyd C.; and Gregurech, Steve, 4,879,086, Cl. 376-173.000.
Messerschmidt, Roger G.: *See*—
Sting, Donald W.; and Messerschmidt, Roger G., 4,878,747, Cl. 350-511.000.
Messerschmitt-Bolkow-Blohm GmbH: *See*—
Hessel, Stefan; and Ischinger, Thomas, 4,878,725, Cl. 350-96.150.
Messner, Helmut, to Bruderer AG. Press. 4,878,288, Cl. 29-568.000.
Metais, Jacques J. Device for the collection of various substances present in a liquid. 4,879,026, Cl. 210-123.000.
Metallurgical Industries, Inc.: *See*—
Saltzman, Gilbert A.; Wertz, Timothy A.; and Friedman, Ira L., 4,878,953, Cl. 148-4.000.
Metzelfeld, Glenn S.; Buckely, James A. V.; and Brown, Donald D., to Hayes Industrial Brake, Inc. Tab-aligned replaceable cartridge for master cylinder. 4,878,346, Cl. 60-588.000.
Metzelfeld, Glenn S.: *See*—
Buckley, James A. V.; Brown, Donald D.; and Metzelfeld, Glenn S., 4,878,567, Cl. 192-18.00R.
Meul, Thomas, to Lonza Ltd. 4-Benzyloxy-3-pyrrolin-2-on-1-yl acetamide production. 4,879,393, Cl. 548-544.000.
Meunier, Jean-Paul, deceased (by Gillet, Xavier, executor), to Isover Saint-Gobain. Subtratum for soil-free cultivation. 4,879,172, Cl. 428-280.000.
Meyer, Alfons. Draw-string carrying bag. 4,878,764, Cl. 383-72.000.
Meyer, Frank W., Jr., to Worldwide Oilfield Machine, Inc. Valve seat assembly. 4,878,651, Cl. 251-172.000.
Meyer, Helmut; and Seeberger, Jurgen, to Heidelberger Druckmaschinen AG. Method and device for measuring the temperature of a brushless d-c motor. 4,879,497, Cl. 318-254.000.
Meyer, Wolfram: *See*—
Akerman, Paul; and Meyer, Wolfram, 4,878,804, Cl. 415-111.000.
Meyers, Arnold G., to Clemmer Industries Limited. Air deflector for maintaining cleanliness of windows of a vehicle. 4,878,707, Cl. 296-91.000.
MHB Joint Venture: *See*—
Lundsgaard, Jorgen S., 4,879,190, Cl. 429-94.000.
Micafil AG: *See*—
Oesch, Gustav; Gmeiner, Paul; and Hofer, Urs, 4,879,004, Cl. 203-89.000.
Micali, Silvio: *See*—
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Michaelis, A. John: *See*—
Bartky, W. Scott; Paton, Anthony D.; Temple, Stephen; and Michaelis, A. John, 4,879,568, Cl. 346-140.00R.
Michalski, Chris A.: *See*—
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Michikawa, Kohei: *See*—
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Micron Technology, Inc.: *See*—
Johnson, Gary M.; and Nevill, Leland R., 4,879,631, Cl. 361-386.000.
Mieno, Fumitake: *See*—
Deguchi, Tatsuya; and Mieno, Fumitake, 4,879,255, Cl. 431-59.000.
Migler, Bernard M.: *See*—
Warawa, Edward J.; and Migler, Bernard M., 4,879,288, Cl. 514-211.000.
Mihara, Yuji: *See*—
Ishigaki, Kunio; Takahashi, Toshiro; Mihara, Yuji; Adachi, Keiichi; Ohno, Shigeru; Okada, Masahiro; and Saeki, Naomi, 4,879,204, Cl. 430-512.000.
Mikhail, Ameer G., to United States of America, Army. Multistage kinetic energy penetrator. 4,878,432, Cl. 102-309.000.
Miki, Masaharu, to Seiki Seiki Kabushiki Kaisha. Vacuum pump. 4,878,813, Cl. 417-2.000.
Miles, David E.: *See*—
Woo, James T. K.; Reising, John C.; Marcinko, Richard M.; and Miles, David E., 4,879,344, Cl. 525-100.000.
Mileti, Robert J. Kite bridle and link system and method for making same. 4,878,636, Cl. 244-155.00A.
Milla, Peter: *See*—
Kruehler, Wolfgang; and Milla, Peter, 4,879,251, Cl. 437-4.000.
Miller, Murray G. W., to Murlyn Enterprises Ltd. Harness for shoulder supported bag. 4,878,606, Cl. 224-208.000.
Miller, Sally A.: *See*—
Petersen, Frank P.; Grothaus, Gary D.; and Miller, Sally A., 4,879,217, Cl. 435-7.000.
Minakuchi, Hiroshi: *See*—
Tadashi, Kunihira; and Minakuchi, Hiroshi, 4,879,754, Cl. 388-810.000.
Minami, Kouichi: *See*—
Yamaguchi, Hidehiko; Minami, Kouichi; and Kobayashi, Nobuo, 4,878,873, Cl. 446-321.000.
Minaskanian, Gevork; and Peck, James V., to Nelson Research & Development Co. Penetration enhancers for transdermal delivery of systemic agent. 4,879,275, Cl. 514-24.000.
Minigrip, Inc.: *See*—
Ausnit, Steven, 4,878,763, Cl. 383-65.000.
Ven Erden, Donald L., 4,878,987, Cl. 156-519.000.
Minnesota Mining and Manufacturing Company: *See*—
Chamberlin, Davis W.; Leonard, Vurnen J.; and Koizumi, Osamu, 4,879,621, Cl. 360-133.000.
Johannessen, Birger, 4,879,419, Cl. 568-606.000.
Marabella, Charles P., 4,879,174, Cl. 428-321.500.
Norbury, R. James; and Pendergrass, Daniel B., Jr., 4,878,775, Cl. 401-132.000.
Ouderkirk, Andrew J.; Dunn, Douglas S.; and Warner, Robert W., 4,879,176, Cl. 428-323.000.
Ugro, Josef V., Jr., 4,879,175, Cl. 428-321.500.
Minnick, Walter J., Jr.: *See*—
Balsamico, William A.; and Minnick, Walter J., Jr., 4,878,523, Cl. 141-114.000.
Minolta Camera Kabushiki Kaisha: *See*—
Fujii, Katsuyuki, 4,879,565, Cl. 346-75.000.
Kikukawa, Yoshiiku; Nakasa, Masayuki; Yoshida, Tadahiro; Kitaura, Mashio; Nakai, Masaaki; Omaki, Takanobu; and Taniguchi, Nobuyuki, 4,878,751, Cl. 354-410.000.
Maruta, Syuzi; and Ito, Masazumi, 4,879,575, Cl. 355-208.000.
Naito, Yoshikazu, 4,879,576, Cl. 355-214.000.
Nakamura, Minoru; and Ito, Masazumi, 4,879,574, Cl. 355-204.000.
MIPS Computer Systems, Inc.: *See*—
Hansen, Craig C., 4,879,676, Cl. 364-748.000.
Mirabel, Pierre; and Schoumacher, Marcel, to Devtex. Device for drawing roves or slivers of fibers on a spinning machine. 4,878,268, Cl. 19-258.000.
Mischke, Georg H.: *See*—
Plank, Friedrich W.; Machnig, Helmut; Mischke, Georg H.; Friedrichs, Reinhard; and Nahrmann, Norbert, 4,878,623, Cl. 241-5.000.
Misic, George J.: *See*—
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Misra, Virkam: *See*—
Silversides, David W.; Mapletoft, Reuben J.; Murphy, Bruce D.; and Misra, Virkam, 4,879,112, Cl. 424-85.900.
Misuda, Katsutoshi; and Hasegawa, Takafumi, to Asahi Glass Company, Ltd. Carrier medium for a coloring matter. 4,879,166, Cl. 428-212.000.

Mita Industrial Co., Ltd.: *See*—
Hisajima, Masahiko; Kimura, Hiroshi; Shigemura, Yutaka; Yada, Isao; Irie, Yoichiro; Morimoto, Kiyoshi; and Nagashima, Takashi, 4,879,578, Cl. 355-234.000.
Irie, Yoichiro, 4,878,660, Cl. 271-293.000.

Mitaki, Kazuya: *See*—
Kihara, Hiroyuki; and Mitaki, Kazuya, 4,879,669, Cl. 364-550.000.

Mitarai, Akira; and Yamamoto, Hachizou, to Sharp Kabushiki Kaisha. Flat keyboard arrangement. 4,879,548, Cl. 340-712.000.

Mitchell, Allan T.; Tigelaar, Howard L.; Garg, Shaym G.; and Rao, Kalipatnam V., to Texas Instruments Incorporated. Method for reduction of filaments between electrodes. 4,878,996, Cl. 156-653.000.

Mitchell, Colin H.: *See*—
Kenworthy, Gordon; Mitchell, Colin H.; and Hawkins, Keith S., 4,879,089, Cl. 376-399.000.

Mitomi, Mitsuo: *See*—
Konno, Yutaka; Kawata, Hiroitsu; Aruga, Masayoshi; Sonobe, Takashi; and Mitomi, Mitsuo, 4,879,119, Cl. 424-449.000.

Mitra, Udayanath: *See*—
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Mitsubishi Denki K.K.: *See*—
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Mitsubishi Denki Kabushiki Kaihsa: *See*—
Aoki, Hideki; Murata, Mitsuru; and Sakamoto, Hirotaka, 4,879,503, Cl. 318-809.000.

Mitsubishi Denki Kabushiki Kaisha: *See*—
Anami, Kenji; Ichinose, Katsuki; and Wada, Tomohisa, 4,879,690, Cl. 365-201.000.
Fukumoto, Hiroshi; Namura, Koji; Naruki, Kenichi; and Une, Ryuzo, 4,878,772, Cl. 400-120.000.
Iwata, Masanari, 4,879,499, Cl. 318-568.160.
Kikuda, Shigeru; and Miyamoto, Hiroshi, 4,879,679, Cl. 365-149.000.
Mori, Akihiko, 4,879,655, Cl. 364-426.040.
Mori, Ryuichiro; Osaka, Syuichi; and Banjo, Toshinobu, 4,878,610, Cl. 228-6.200.
Nakabayashi, Takeo; and Andou, Hideki, 4,879,715, Cl. 370-92.000.
Ohashi, Masato; and Kodai, Shiyojiro, 4,879,153, Cl. 428-76.000.
Zumoto, Nobuyuki; Sakamoto, Masahiko; and Hoshinouchi, Susumu, 4,879,473, Cl. 250-492.200.

Mitsubishi Kinzoku Kabushiki Kaisha: *See*—
Masuda, Yasuo; Takahashi, Tsutomu; Takizawa, Yoshio; and Yoshiki, Naokazu, 4,879,185, Cl. 428-687.000.

Mitsubishi Monsanto Chemical Company: *See*—
Aoki, Yuji; and Miyazaki, Hiroaki, 4,879,343, Cl. 525-71.000.

Mitsubishi Oil Co., Ltd.: *See*—
Yano, Hisashi; Ihara, Hiroyuki; and Yabumoto, Junsuke, 4,878,924, Cl. 55-204.000.

Mitsubishi Paper Mills, Ltd.: *See*—
Kohmura, Isao; Senga, Takao; Furukawa, Akira; Yamamoto, Hirokazu; Nakatani, Mamoru; and Yamada, Jun, 4,879,197, Cl. 430-119.000.
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Mitsubishi Petrochemical Co., Ltd.: *See*—
Kobayashi, Yoshinobu; Itou, Tosio; and Inoue, Takayuki, 4,879,360, Cl. 525-396.000.

Mitsubishi Rayon Company Ltd.: *See*—
Hongo, Masafumi; and Noda, Mitsuaki, 4,879,329, Cl. 524-114.000.

Mitsuhashi, Yoshio, to M.G.S. Japan Co., Ltd. Hand stapler for use with a bar of ornamented staples. 4,878,608, Cl. 227-120.000.

Mitsui Petrochemical Industries, Ltd.: *See*—
Kaneko, Katsutoshi; Kobayashi, Toshio; and Watari, Mitsuru, 4,878,972, Cl. 156-78.000.

Mitsui Toatsu Chemicals, Inc.: *See*—
Ishiwata, Ken-ichi; Nakamura, Takeshi; Makiguchi, Nobuyoshi; Miyahara, Shoichiro; Matsumoto, Toshio; and Nitta, Kazunari, 4,879,411, Cl. 562-401.000.
Iwasaki, Kozo; Kuragano, Morimasa; Koshibe, Minoru; Sezaki, Yoshihiro; Yoguchi, Katsuji; and Koyama, Yoshio, 4,879,412, Cl. 562-600.000.

Mitsuya, Hiroaki; and Broder, Samuel, to United States of America, Health and Human Services. Antiviral compositions and methods. 4,879,277, Cl. 514-49.000.

Mitutoyo Corporation: *See*—
Andermo, Nils I., 4,879,508, Cl. 324-61.00R.

Mitutoyo Mfg. Co., Ltd.: *See*—
Arai, Yoshihiro; Sasaki, Kouji; and Ohsaki, Takanori, 4,879,552, Cl. 340-870.370.

Mitzkus, Jurgen; and Wiesner, Dieter, to TRW Repa GmbH. Cover of a driver-side gas bag collision protection device in motor vehicles. 4,878,689, Cl. 280-731.000.

Miura, Kenichi; and Kobayashi, Hiromichi, to Kabushiki Kaisha Toshiba. Stereoscopic camera apparatus which incorporates cameras and can commonly adjust directions of the cameras. 4,879,596, Cl. 358-88.000.

Miura, Yutaka: *See*—
Taguchi, Jisei; Miura, Yutaka; Iwanaga, Kenji; and Tada, Manabu, 4,879,536, Cl. 335-128.000.

Miwa, Hideo; Tsuruoka, Kazuhiro; Yamsuchi, Koudou; Endoh, Hitoshi; and Odaka, Masanori, to Hitachi, Ltd.; and Hitachi VLSI Engineering Corp. Semiconductor integrated circuit device. 4,879,681, Cl. 365-189.010.

Miwa, Takeru; and Noda, Iwao, to Kyocera Corporation. Ceramic prostheais for living body & method of making the same. 4,878,914, Cl. 623-16.000.

Miyagi, Kunihiko, to Machida Endoscope Co., Ltd. Water-tight endoscope. 4,878,484, Cl. 128-4.000.

Miyahara, Shoichiro: *See*—
Ishiwata, Ken-ichi; Nakamura, Takeshi; Makiguchi, Nobuyoshi; Miyahara, Shoichiro; Matsumoto, Toshio; and Nitta, Kazunari, 4,879,411, Cl. 562-401.000.

Miyaishi, Yoshinori: *See*—
Sakakibara, Shiro; Miyaishi, Yoshinori; and Kano, Yoshiaki, 4,878,887, Cl. 474-245.000.

Miyake, Jiro: *See*—
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Miyake, Tetsuo: *See*—
Miyazawa, Tatsuo; Yokoyama, Shigeyuki; and Miyake, Tetsuo, 4,879,223, Cl. 435-68.000.

Miyake, Yoshihiko: *See*—
Iida, Muneo; Honda, Masanobu; Kawamura, Katsumi; Daito, Hiroshi; Miyake, Yoshihiko; Setone, Shouichi; Takahashi, Hatsuo; and Nakanishi, Michihiro, 4,879,618, Cl. 360-106.000.

Miyamoto, Hiroshi: *See*—
Kikuda, Shigeru; and Miyamoto, Hiroshi, 4,879,679, Cl. 365-149.000.

Miyazaki, Hiroaki: *See*—
Aoki, Yuji; and Miyazaki, Hiroaki, 4,879,343, Cl. 525-71.000.

Miyazawa, Tatsuo; Yokoyama, Shigeyuki; and Miyake, Tetsuo, to Wakunaga Seiyaku Kabushiki Kaisha. Method for producing protein containing nonprotein amino acids. 4,879,223, Cl. 435-68.000.

Mizoguchi, Tetsuhiko; Inomata, Koichiro; Higuchi, Toru; and Sakai, Isao, to Kabushiki Kaisha Toshiba. Permanent magnetic alloy and method of manufacturing the same. 4,878,964, Cl. 148-302.000.

Mizutani, Mario, to Print Kiko Co., Ltd. Form collator gluing apparatus. 4,878,981, Cl. 156-356.000.

Moats, Tommy O.: *See*—
Marier, Gregory J.; and Moats, Tommy O., 4,878,339, Cl. 56-14.700.

Mobay Corporation: *See*—
Markusch, Peter H.; Mason, Arthur W.; and Wenzel, Wolfgang D., 4,879,322, Cl. 523-322.000.

Mobil Oil Corporation: *See*—
Harandi, Mohsen N., 4,879,424, Cl. 585-322.000.

Mobility Work Trays, Inc.: *See*—
Bahm, Glenn A., 4,878,685, Cl. 280-304.100.

Mochizuki, Chiori: *See*—
Ohkubo, Yukitoshi; Watanabe, Yasuyuki; Mochizuki, Chiori; Ishii, Takayuki; Yamanobe, Masato; and Ishiwata, Kazuya, 4,878,742, Cl. 350-347.00V.

Mohajerani, Khosrow: *See*—
Sampietro, Joseph M.; and Mohajerani, Khosrow, 4,879,617, Cl. 360-106.000.

Molex Incorporated: *See*—
Dechelette, Helen M. P., 4,878,858, Cl. 439-607.000.

Molnar, Terrence O. Stroller car seat. 4,878,680, Cl. 280-30.000.

Momma, Naohiro: *See*—
Kurokawa, Hideaki; Yamada, Akira; Koseki, Yasuo; Matsuzaki, Harumi; Ebara, Katsuya; Takahashi, Sankichi; Yoda, Hiroaki; Hayashi, Nobuatsu; Okouchi, Isao; Hishinuma, Yukio; and Momma, Naohiro, 4,879,041, Cl. 210-640.000.

Mondt, William E.: *See*—
Stolarczyk, Larry G.; Smoker, Kurt A.; Boese, Gerald J.; Mondt, William E.; Hasenack, Marvin L., Jr.; Zappanti, James L.; Smith, Seth A.; and Moore, Edward D., 4,879,755, Cl. 455-3.000.

Monell Chemical Senses Center: *See*—
Cutler, Winnifred B.; Preti, George; and Huggins, George R., 4,879,244, Cl. 436-65.000.

Monier Redland Limited: *See*—
Tomlinson, Robert K., 4,878,759, Cl. 366-56.000.

Monma, Kohji: *See*—
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Monsanto Company: *See*—
Blyth, Randolph C.; and Ucci, Pompelio A., 4,879,180, Cl. 428-395.000.
Getman, Daniel P.; and Heintz, Robert M., 4,879,371, Cl. 530-334.000.
Getman, Daniel P.; Periana, Roy A.; and Riley, Dennis P., 4,879,398, Cl. 556-413.000.

Montes, Raul R.: *See*—
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Sublette, Kerry L.; Woolsey, Maron E.; Manning, Francis S.; Montgomery, Anne D.; and McInerney, Michael J., 4,879,240, Cl. 435-252.100.

Mookherjee, Braja D.; Trenkle, Robert W.; Calderone, Nicholas; and Sands, Keith P., to International Flavors & Fragrances Inc. Schiff base reaction products of alkyl anthranilates and organoleptic uses thereof and deodorancy uses thereof. 4,879,271, Cl. 512-20.000.

Moon, Marcus P.: *See*—
Dumas, Donald J.; and Moon, Marcus P., 4,878,937, Cl. 71-90.000.

Moon, Seaton; and Bergene, Mark A., to Deere & Company. Brake system for four-wheel drive vehicles. 4,878,559, Cl. 180-244.000.

Moore Business Forms: *See*—
Badger, Ernest E.; Sornberger, G. Russell; and Anderson, Michael W., 4,878,613, Cl. 229-75.000.
Moore, Edward D.: *See*—
Stolarczyk, Larry G.; Smoker, Kurt A.; Boese, Gerald J.; Mondt, William E.; Hasenack, Marvin L., Jr.; Zappanti, James L.; Smith, Seth A.; and Moore, Edward D., 4,879,755, Cl. 455-3.000.
Moore, John B.: *See*—
Chakravarty, Abhijit J. M.; Gangsaas, Dagfinn; and Moore, John B., 4,879,643, Cl. 364-148.000.
Moore, Robert E., to Adamantech, Inc. Preparation of a gel having gas transporting capability. 4,879,062, Cl. 252-315.100.
Morand, Adolf: *See*—
Buser, Hansjorg; and Morand, Adolf, 4,879,413, Cl. 564-63.000.
Morand, Peter; Drew, Jacinta; Szabo, Arthur G.; and Proulx, Pierre R. Fluorescent conjugated polyene sterol derivatives as cell membrane probes. 4,879,069, Cl. 260-397.200.
More, Anthony P.: *See*—
Stroble, Carl P.; and More, Anthony P., 4,878,959, Cl. 148-111.000.
Morgan, Alton C., Jr.; Woodhouse, Clive S.; and McIntyre, Robert F., to NeoRx Corporation. Enhanced production of antibodies utilizing insolubilized immune complexes. 4,879,225, Cl. 435-68.000.
Morgan, Gene E.; and Dyer, Gerald E., to United States of America, National Aeronautics and Space Administration. Internal wire guide for GTAW welding. 4,879,446, Cl. 219-75.000.
Morgan, Jeffrey S.: *See*—
Tofsland, Kenneth M.; Morgan, Jeffrey S.; Grytten Holm, Eric G.; and Jaroszczyk, Tadeusz, 4,878,929, Cl. 55-486.000.
Morgan, Peter E. D.: *See*—
Marshall, David B.; De Wames, Roger E.; Morgan, Peter E. D.; and Ratto, Joseph J., 4,879,537, Cl. 335-216.000.
Morgan, Richard A., to Du Pont de Nemours, E. I., and Company. Modified polytetrafluoroethylene resins. 4,879,362, Cl. 526-247.000.
Mori, Akihiko, to Mitsubishi Denki Kabushiki Kaisha. Constant speed cruising control apparatus. 4,879,655, Cl. 364-426.040.
Mori, Ryuichiro; Osaka, Syuichi; and Banjo, Toshinobu, to Mitsubishi Denki Kabushiki Kaisha. Die bonding apparatus. 4,878,610, Cl. 228-6.200.
Mori, Tamotsu; and Yasuda, Makoto, to Matsushita Electric Works, Ltd. Remotely controllable circuit breaker. 4,879,535, Cl. 335-14.000.
Mori, Yoshiharu; Yamada, Suzuya; Saito, Mitsuaki; Hagiwara, Hirotoshi; and Ehara, Kenichi, to Denki Kagaku Kogyo Kabushiki Kaisha. Thermionic cathode structure. 4,878,866, Cl. 445-36.000.
Moriguchi, Soyao; Suzuki, Hiroshi; Watanabe, Hiroko; Satoh, Motoaki; Abe, Michio; and Iwata, Yasuo, to Showa Denko Kabushiki Kaisha; and Kawasumi Kagaku Kougiyou Kabushiki Kaisha. Adsorbent composed of porous beads of chitosan and adsorption method using same. 4,879,340, Cl. 525-54.200.
Morii, Seiji: *See*—
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Morikawa, Minoru: *See*—
Takagi, Masamichi; Yano, Keiji; Shibuya, Ichiro; and Morikawa, Minoru, 4,879,230, Cl. 435-172.300.
Morimitsu, Toshihiko; Harada, Naoki; and Omura, Takashi, to Sumitomo Chemical Company, Limited. Fiber reactive compound having sym-triazine and aminobenzoylamine moieties. 4,879,372, Cl. 534-618.000.
Morimoto, Kiyoshi: *See*—
Hisajima, Masahiko; Kimura, Hiroshi; Shigemura, Yutaka; Yada, Isao; Irie, Yoichiro; Morimoto, Kiyoshi; and Nagashima, Takashi, 4,879,578, Cl. 355-234.000.
Morimoto, Makoto: *See*—
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Morimoto, Shinichi, to Shimano Industrial Company Limited. Drag mechanism for a double-bearing fishing reel. 4,878,633, Cl. 242-268.000.
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Kawanishi, Hidenori; Yamaguchi, Masahiro; Hayashi, Hiroshi; Morimoto, Taiji; and Kaneiwa, Shinji, 4,879,725, Cl. 372-48.000.
Morin, Paul G.; and Hoes, Tommy L., to Oscar Mayer Foods Corporation. Method of pre-cooking bacon. 4,879,128, Cl. 426-392.000.
Moriya, Yasuo; Suzuki, Nobuyoshi; and Goto, Hiroshi, to Nippon Oil and Fats Co., Ltd. Graft polymerization preformer and method of manufacturing the same. 4,879,347, Cl. 525-263.000.
Morley, Peter S.: *See*—
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Fray, Derek J.; and Morris, David R., 4,879,005, Cl. 204-1.00T.
Morrish, Peter G. A.; and Edwards, William B., to Morrish, Peter G. A.; and Morrish, Priscilla D. Spring clip. 4,878,276, Cl. 24-511.000.
Morrish, Priscilla D.: *See*—
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Morton Thiokol, Inc.: *See*—
Cunningham, Donald J., 4,878,690, Cl. 280-741.000.
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Moruta, Masaya: *See*—
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Mosanto Company: *See*—
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Moser, Winfried; and Klinke, Christian, to Robert Bosch GmbH. Evaluation device for measuring signals of a lambda probe. 4,878,381, Cl. 73-118.100.
Motai, Hiroshi; Fukushima, Yaichi; Fukase, Tetsuro; and Itoh, Harumichi, to Japanese Research and Development Association for Bioreactor System, The. Process for producing protease by cultivating a protease-producing mold in a liquid medium. 4,879,235, Cl. 435-225.000.
Motegi, Takeo; Yamazaki, Mitsumasa; Iguchi, Hiroyuki; and Kasahara, Kaoru, to Hodogaya Chemical Co., Ltd. Benzamide derivative, process for its production and plant growth regulant. 4,878,942, Cl. 71-109.000.
Motor Wheel Corporation: *See*—
Kindel, Leslie M.; and Rai, Iqbal S., 4,878,716, Cl. 305-21.000.
Motorola, Inc.: *See*—
Braun, Jeffrey J., 4,879,506, Cl. 323-314.000.
Burch, Kenneth R.; and Rivas, Mario A., 4,879,733, Cl. 377-44.000.
DeLuca, Michael J.; and Reed, Jeffrey B., 4,879,758, Cl. 455-296.000.
de Muro, David M.; Stillmank, John G.; and Rabe, Duane C., 4,879,533, Cl. 333-206.000.
Engles, Bruce E., 4,879,682, Cl. 365-189.010.
Hall, James B.; Robinson, Martin G.; and Swift, Ronald C., 4,878,988, Cl. 156-600.000.
Mullen, William B., III, 4,878,851, Cl. 439-83.000.
Stefaniu, Marian; Gran, Paul; Feiner, Haim, deceased; and Feiner, Ilana, heiress, 4,879,541, Cl. 340-825.070.
Mrsny, Randall J.; Birrell, G. Bruce; and Volwerk, Johannes J., to State of Oregon Acting By and Through the State Board of Higher Education On Behalf of the University of Oregon. Crosslinking receptor-specific probes for electron microscopy. 4,879,220, Cl. 435-7.000.
MTU Motoren-und Turbinen-Union Muenchen GmbH: *See*—
Pillhoefer, Horst, 4,878,952, Cl. 148-1.000.
MTU Motoren-und Turbinen-Union Munchen GmbH: *See*—
Huether, Werner; Rossman, Axel; and Sikorski, Siegfried, 4,878,821, Cl. 415-9.000.
Mueller, Louis H. Prefilled catheter tip syringe kit. 4,878,903, Cl. 604-199.000.
Muhlberger, Michael A.; and Rapp, Willard E., to American Telephone and Telegraph Company. Method and apparatus for attaching connectors. 4,878,295, Cl. 29-863.000.
Mukai, Hiroshi: *See*—
Shionozaki, Yoshio; Mukai, Hiroshi; Obikawa, Tsuyoshi; and Yamada, Shuhei, 4,879,060, Cl. 252-299.610.
Mukai, Toyoharu: *See*—
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Mullane, William I., Jr., to Procter & Gamble Company, The. Stationary support member in forming area for uniformly debossing and aperturing a moving plastic web. 4,878,825, Cl. 425-290.000.
Mullen, Charles F. Modular space station. 4,878,637, Cl. 244-159.000.
Mullen, William B., III, to Motorola, Inc. Electrical socket apparatus with temporary housing. 4,878,851, Cl. 439-83.000.
Muller, Eduard, to Maschinenfabrik Sulzer-Burckhardt AG. Apparatus for removing oil from a compressed gas flow. 4,878,923, Cl. 55-185.000.
Muller, Jean F.; Tollitte, Francois G.; Krier, Gabriel; Dominiak, Serge; Eberhardt, Andre; and Berveiller, Marcel, to Universite de Metz. Apparatus for the translatory manipulation of an element such as an axle. 4,879,467, Cl. 250-288.000.
Muller, John, to Davidson Textron Inc. Plastic shell for foam moldings. 4,878,827, Cl. 425-434.000.
Mullin, Geralyn, to Akzo America Inc. High temperature polyol ester/-phosphate ester crankcase lubricant composition. 4,879,052, Cl. 252-32.500.
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Munir, Zuhair A.: *See*—
Halverson, Danny C.; Lum, Beverly Y.; and Munir, Zuhair A., 4,879,262, Cl. 501-87.000.
Mura, Albert J.; and Zercie, Robert W., to Eastman Kodak Company. Use of substituted ortho-quinones as electron transfer agents in analytical determinations. 4,879,243, Cl. 436-63.000.
Murakami, Terukiyo: *See*—
Tamura, Minoru; Katayose, Shinji; Murakami, Terukiyo; and Izumi, Hisashi, 4,879,657, Cl. 364-431.070.
Muramatsu, Masahiro, to Yazaki Corporation. Automotive instrument. 4,878,387, Cl. 73-866.300.
Murata Kikai Kabushiki Kaisha: *See*—
Kawarabashi, Tsukasa, 4,878,342, Cl. 57-58.490.
Murata, Mitsuru: *See*—
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Murata, Shinji: *See*—
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Murata, Yoshitoshi: *See*—
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Murlyn Enterprises Ltd.: *See*—
Miller, Murray G. W., 4,878,606, Cl. 224-208.000.
Murofushi, Masanori, to NEC Corporation. Linear pulse motor. 4,879,482, Cl. 310-12.000.
Murphy, Bruce D.: *See*—
Silversides, David W.; Mapletoft, Reuben J.; Murphy, Bruce D.; and Misra, Virkam, 4,879,112, Cl. 424-85.900.
Murphy, Kenneth S.: *See*—
Gostic, William J.; Khan, Abdus S.; and Murphy, Kenneth S., 4,878,965, Cl. 148-404.000.
Murray, Dale D.: *See*—
Caron, Bernard G.; Gutterman, Pamela R.; and Murray, Dale D., 4,878,731, Cl. 350-96.210.
Murray, Gary P.: *See*—
Dunham, Byron J.; Murray, Gary P.; and Bulla, Don A., 4,879,546, Cl. 340-632.000.
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Myer, Robert E., to American Telephone and Telegraph Company, AT&T Bell Labs. Predistortion compensated linear amplifier. 4,879,519, Cl. 330-149.000.
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Myers, Larry F.; Tharp, Douglas B.; and Holl, Ralph H., to Consolidated Rail Corporation. Hot bearing simulator. 4,878,437, Cl. 105-451.000.
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Nadkarni, Anil V.: *See*—
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Naduty, Vladimir P.: *See*—
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Naeumann, Fritz; Hoelderich, Wolfgang; and Merger, Franz, to BASF Aktiengesellschaft. Preparation of pentenoic esters. 4,879,405, Cl. 560-211.000.
Nagae, Kouji: *See*—
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Nagai, Koichi: *See*—
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Nagasawa, Kenichi: *See*—
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Nagase, Masaomi; Ito, Yoshiyasu; Kizaki, Mikio; Matsuno, Kiyotaka; Tsukamoto, Keisuke; and Kobayashi, Fumiaki, to Toyota Jidosha Kabushiki Kaisha. Method and device for correcting a fuel injection quantity in a diesel engine. 4,879,673, Cl. 364-571.010.
Nagashima, Noriaki; Monma, Kohji; and Murata, Yoshitoshi, to NEC Corporation; and Nippon Telegraph and Telephone Corporation. Wide area cordless telephone system having means for avoiding double registrations. 4,879,740, Cl. 379-61.000.
Nagashima, Takashi: *See*—
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Nagata, Shinichi: *See*—
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Nahrmann, Norbert: *See*—
Plank, Friedrich W.; Machnig, Helmut; Mischke, Georg H.; Friedrichs, Reinhard; and Nahrmann, Norbert, 4,878,623, Cl. 241-5.000.
Naito, Yoshikazu, to Minolta Camera Kabushiki Kaisha. Exposure control device and method. 4,879,576, Cl. 355-214.000.
Nakabayashi, Takeo; and Andou, Hideki, to Mitsubishi Denki Kabushiki Kaisha. Terminal equipment identifier controlling circuit. 4,879,715, Cl. 370-92.000.
Nakagawa, Akio: *See*—
Yamaguchi, Yoshihiro; Watanabe, Kiminori; Nakagawa, Akio; Furukama, Kazuyoshi; Fukuda, Kiyoshi; and Tanzawa, Katsujiro, 4,878,957, Cl. 148-33.300.
Nakagawa, Yo hihiko: *See*—
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Nakagome, Fuyuki, to Nakamichi Corporation. Apparatus for driving a reel in a tape cartridge for a magnetic instrument. 4,879,614, Cl. 360-93.000.
Nakai, Masaaki: *See*—
Kikukawa, Yoshiiku; Nakasa, Masayuki; Yoshida, Tadahiro; Kitaura, Mashio; Nakai, Masaaki; Omaki, Takanobu; and Taniguchi, Nobuyuki, 4,878,751, Cl. 354-410.000.
Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, to Diesel Kiki Co., Ltd. Variable capacity compressor with capacity-indicating device. 4,878,814, Cl. 417-63.000.
Nakajoh, Tadashi: *See*—
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Nakamichi Corporation: *See*—
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Nakamoto, Satoru: *See*—
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Nakamura, Masao; and Tonokawa, Hiroshi, to Asahi Kasei Kogyo Kabushiki Kaisha; and Dow Chemical Company, The. Heat insulating structures for low-temperature or cryogenic pipings. 4,878,520, Cl. 138-149.000.
Nakamura, Minoru; and Ito, Masazumi, to Minolta Camera Kabushiki Kaisha. Copying apparatus having an automatic document feeder and at least two operation modes. 4,879,574, Cl. 355-204.000.
Nakamura, Takeshi: *See*—
Ishiwata, Ken-ichi; Nakamura, Takeshi; Makiguchi, Nobuyoshi; Miyahara, Shoichiro; Matsumoto, Toshio; and Nitta, Kazunari, 4,879,411, Cl. 562-401.000.
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Nakamura, Yoshiyuki; and Koyama, Teruo, to Koyo Seiko Kabushiki Kaisha. Drive mechanism for tiltable steering column. 4,878,394, Cl. 74-493.000.
Nakanishi, Michihiro: *See*—
Iida, Muneo; Honda, Masanobu; Kawamura, Katsumi; Daito, Hiroshi; Miyake, Yoshihiko; Setone, Shouichi; Takahashi, Hatsuo; and Nakanishi, Michihiro, 4,879,618, Cl. 360-106.000.
Nakaniwa, Shinpei; and Uchikawa, Akira, to Japan Electronic Control Systems Co. Ltd. Internal combustion engine with electronic air-fuel ratio control apparatus. 4,878,473, Cl. 123-489.000.
Nakano, Hiroshi; Takeuchi, Toyoaki; Tsunoda, Toshiyuki; and Kinukawa, Masahiko, to Olympus Optical Co., Ltd. Surgical microscope apparatus. 4,878,746, Cl. 350-507.000.
Nakao, Toshiyuki: *See*—
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Nakasa, Masayuki: *See*—
Kikukawa, Yoshiiku; Nakasa, Masayuki; Yoshida, Tadahiro; Kitaura, Mashio; Nakai, Masaaki; Omaki, Takanobu; and Taniguchi, Nobuyuki, 4,878,751, Cl. 354-410.000.
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Nakata, Mitsuhiko: *See*—
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Nakura, Yoshiyuki; and Kato, Yasuo, to Canon Kabushiki Kaisha. Liquid crystal element. 4,879,144, Cl. 428-1.000.
Namikoshi, Hajime; Shibata, Tohru; and Okamoto, Ichiro, to Daicel Chemical Industries, Ltd. Separation agent comprising acyl- or carbamoyl-substituted polysaccharide. 4,879,038, Cl. 210-635.000.
Namura, Koji: *See*—
Fukumoto, Hiroshi; Namura, Koji; Naruki, Kenichi; and Une, Ryuzo, 4,878,772, Cl. 400-120.000.
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Narui, Satoshi: *See*—
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Naruki, Kenichi: *See*—
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Naser, Georg; Reichenberger, Helmut; and Schlee, Karl-Heinz, to Siemens Aktiengesellschaft. Shock wave tube with long service life. 4,878,488, Cl. 128-24.00A.
Nassler, Peter, to Siemens Aktiengesellschaft. Hearing aid with cerumen trapping gap. 4,879,750, Cl. 381-68.600.
National Molding Corp.: *See*—
Anscher, Joseph A.; and Dillner, James, 4,878,269, Cl. 24-115.00G.
National Nuclear Corporation Ltd.: *See*—
Kenworthy, Gordon; Mitchell, Colin H.; and Hawkins, Keith S., 4,879,089, Cl. 376-399.000.

National Research Development Corporation: *See*—
Fray, Derek J.; and Morris, David R., 4,879,005, Cl. 204-1.00T.
Schram, Cornelius J., 4,879,011, Cl. 204-157.420.
Naton, Paul E., to Oatey Company. Lead- and antimony-free solder composition. 4,879,096, Cl. 420-561.000.
NCR Corporation: *See*—
Mazumder, Ali T., 4,878,773, Cl. 400-234.000.
Neaves, Bryan D.; Hill, Frederick W. L.; and Cross, Malcolm G., to Raychem Limited. Marker assembly. 4,879,148, Cl. 428-40.000.
NEC Corporation: *See*—
Ichiyoshi, Osamu, 4,879,713, Cl. 370-75.000.
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Maeno, Kazutoshi, 4,879,714, Cl. 370-85.700.
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Nagashima, Noriaki; Monma, Kohji; and Murata, Yoshitoshi, 4,879,740, Cl. 379-61.000.
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Taniguchi, Kotaro; Konishi, Toshio; Shimura, Takehiko; Tanimoto, Shigekazu; and Nedzu, Shigeru, 4,879,085, Cl. 264-564.000.
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Hauser, Karlheinz, 4,878,390, Cl. 74-89.150.
Nega, Eva: *See*—
Banasiak, Lothar; Edlich, Wilfried; Lyr, Horst; Nega, Eva; and Sunkel, Marianne, 4,879,291, Cl. 514-237.800.
Negishi, Kiyoshi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Automatic power controller for semiconductor laser. 4,879,459, Cl. 250-205.000.
Neidich, Douglas A., to InterCon Systems, Inc. Pin assembly. 4,878,857, Cl. 439-599.000.
Nelson, Anthony J.: *See*—
Quan, Peter M.; Stewart, David; and Nelson, Anthony J., 4,879,388, Cl. 548-262.000.
Nelson, Clinton D. Method and apparatus for generating pressurized fluid. 4,878,458, Cl. 122-4.00A.
Nelson Industries Inc.: *See*—
Tofsland, Kenneth M.; Morgan, Jeffrey S.; Grytten Holm, Eric G.; and Jaroszczyk, Tadeusz, 4,878,929, Cl. 55-486.000.
Nelson, James A.: *See*—
Stufflebeam, Frank L.; and Nelson, James A., 4,878,262, Cl. 15-53.00B.
Nelson, James R.: *See*—
Doumaux, Arthur R., Jr.; and Nelson, James R., 4,879,401, Cl. 558-488.000.
Nelson, Leonard Y.; Green, John R.; and Wong, Carol W., to Korry Electronics Company. Wavelength encoded optical switches. 4,878,722, Cl. 350-96.200.
Nelson, Lorne W.: *See*—
Beckey, Thomas J.; and Nelson, Lorne W., 4,878,355, Cl. 62-115.000.
Nelson Research & Development Co.: *See*—
Minaskanian, Gevork; and Peck, James V., 4,879,275, Cl. 514-24.000.
Nelson, Richard E. Five bar linkage mechanism. 4,878,374, Cl. 72-446.000.
Nelson, Ronald E. Ankle brace with compression straps. 4,878,504, Cl. 128-80.00H.
Nelson, Thomas E. Truss setting system. 4,878,323, Cl. 52-92.000.
Nelson, Thomas E. Water heater construction. 4,878,459, Cl. 122-494.000.
Nelson, Thomas L.; and Thomas, Lynn B., Sr., to Du Pont de Nemours, E. I., and Company. Apparatus and process for intermingling filament yarns. 4,878,280, Cl. 28-274.000.
NeoRx Corporation: *See*—
Morgan, Alton C., Jr.; Woodhouse, Clive S.; and McIntyre, Robert F., 4,879,225, Cl. 435-68.000.
Nesbitt, Lanny E., to Dorma Door Controls, Inc. Hold-open mechanism for use with a door closer. 4,878,265, Cl. 16-49.000.
Ness, Leif A., to Air Products and Chemicals, Inc. Pulsation dampening device for super critical fluid expansion engine, hydraulic engine or pump in cryogenic service. 4,878,350, Cl. 62-50.100.
Nestec S.A: *See*—
Heyland, Sven; Rolli, Karl; Roschli, David; and Sihver, Jaak J., 4,879,130, Cl. 426-533.000.
Nestec S.A.: *See*—
de Rahm, Olivier, 4,879,131, Cl. 426-583.000.
Nestmeier, Johannes, to MAN Technologie GmbH. Method for measuring double print offset in printing systems. 4,878,753, Cl. 356-237.000.
Neumaier, Anton: *See*—
Plank, Uto; Neumaier, Anton; and Manschitz, Erwin, 4,878,679, Cl. 279-19.400.
Neustadt, Bernard R.: *See*—
Doll, Ronald J.; and Neustadt, Bernard R., 4,879,309, Cl. 514-513.000.
Nevill, Leland R.: *See*—
Johnson, Gary M.; and Nevill, Leland R., 4,879,631, Cl. 361-386.000.
Nevoral, Victor. Indoor hockey puck. 4,878,668, Cl. 273-128.00R.
New York Institute of Technology: *See*—
Glenn, William E., 4,879,602, Cl. 358-233.000.
Newcomb, Nelson F.; and Newcomb, Nelson F., Jr. Illuminated translucent golf ball. 4,878,674, Cl. 273-213.000.
Newcomb, Nelson F., Jr.: *See*—
Newcomb, Nelson F.; and Newcomb, Nelson F., Jr., 4,878,674, Cl. 273-213.000.
Newkirk, Michael A.: *See*—
Chen, Ying C.; Liu, Jia-ming; and Newkirk, Michael A., 4,878,723, Cl. 350-96.140.
Newman, Frederick C.; and Marsella, Louis J., to Continental Can Company, Inc. Polymeric multilayer sheet suitable for the manufacture of microwaveable containers. 4,879,147, Cl. 428-35.000.
Newman, Joseph T.: *See*—
Judy, Millard M.; Matthews, James L.; Newman, Joseph T.; and Sogandares-Bernal, Franklin, 4,878,891, Cl. 604-5.000.
Newnan, Brian D., to Grindmaster Corporation. Bean and nut grinder shift mechanism. 4,878,625, Cl. 241-37.000.
Newton, Robert K.; and Schmalz, Steven M., to Specialty Equipment Companies, Inc. Mixing and dispensing apparatus for a frozen confection machine. 4,878,760, Cl. 366-149.000.
NGK Spark Plug, Co., Ltd.: *See*—
Kito, Tomohisa; Yabuta, Katsuhisa; and Hattori, Yoshinori, 4,878,812, Cl. 416-241.00B.
Nicolon B.V.: *See*—
Vermeulen, Jan, 4,878,446, Cl. 114-27.000.
Niessner, Manfred: *See*—
Rehmer, Gerd; Niessner, Manfred; Heide, Wilfried; Hartmann, Heinrich; and Peters, Karl-Clemens, 4,879,361, Cl. 526-201.000.
Nifco Inc.: *See*—
Kurihara, Kazumasa; Takahashi, Seiji; and Kaneko, Yoshio, 4,878,791, Cl. 411-55.000.
Niinuma, Susumu: *See*—
Aoyagi, Yoshio; Hirano, Hiroyuki; Kimura, Toshiyuki; Niinuma, Susumu; Yoshioka, Minoru; Haeno, Akira; Sato, Takashi; Nishi, Yoshiro; Watanabe, Yoshihiko; Yokogawa, Fumihiko; Matsumoto, Keiichi; and Ogawa, Youichi, 4,879,705, Cl. 369-32.000.
Niki, Hiroshi; Matsunawa, Masahiko; Yamamoto, Hiroyuki; and Abe, Yoshinori, to Konishiroku Photo Industry Co., Ltd. Technique for reproducing an image read from a color original. 4,879,595, Cl. 358-80.000.
Nikka Whisky Distilling Co., Ltd.: *See*—
Takagi, Masamichi; Yano, Keiji; Shibuya, Ichiro; and Morikawa, Minoru, 4,879,230, Cl. 435-172.300.
Nikko Co., Ltd.: *See*—
Ishimoto, Zenichi, 4,878,876, Cl. 446-446.000.
Nilsson, Jerry: *See*—
Tengstrand, Gorand; Lindblom, Boris; Nilsson, Jerry; and Lunden, Peter, 4,878,561, Cl. 181-188.000.
Ninetronix Venture I: *See*—
Pasternak, Eliezer; Drews, Robert C.; and Shalon, Tadmor, 4,878,493, Cl. 128-303.140.
Nippon Antenna Co., Ltd.: *See*—
Takizawa, Akio; and Saito, Syozo, 4,879,570, Cl. 343-713.000.
Nippon Ester Company Ltd.: *See*—
Hirota, Fumio; Kado, Tsutomu; Oku, Shosuke; and Watanabe, Noboru, 4,879,335, Cl. 524-495.000.
Nippon Oil Co., Ltd.: *See*—
Sano, Akira; Kobayashi, Seizo; Matsuura, Kazuo; Yokoyama, Shigeki; and Kamiya, Takeshi, 4,879,076, Cl. 264-28.000.
Nippon Oil and Fats Co., Ltd.: *See*—
Moriya, Yasuo; Suzuki, Nobuyoshi; and Goto, Hiroshi, 4,879,347, Cl. 525-263.000.
Shibato, Kishio; and Kawamura, Masataka, 4,879,337, Cl. 524-504.000.
Nippon Paint Co., Ltd.: *See*—
Tsutsui, Koichi; Ikeda, Shoji; and Ueki, Koji, 4,879,100, Cl. 422-186.050.
Nippon Petrochemicals Co., Ltd.: *See*—
Takahashi, Naoya; Narui, Satoshi; and Matsuzaka, Eiichi, 4,879,269, Cl. 503-213.000.
Nippon Soken, Inc.: *See*—
Ootsuka, Yoshinori; Atsumi, Kinya; Arai, Masumi; and Hattori, Tadashi, 4,879,139, Cl. 427-38.000.
Nippon Steel Chemical Co., Ltd.: *See*—
Hara, Tadanori, 4,879,387, Cl. 549-248.000.
Nippon Telegraph and Telephone Corporation: *See*—
Nagashima, Noriaki; Monma, Kohji; and Murata, Yoshitoshi, 4,879,740, Cl. 379-61.000.
Ohtsuka, Akira; Goto, Tomoji; and Ida, Masao, 4,879,588, Cl. 357-68.000.
Nippon Telegraph & Telephone Public Corporation: *See*—
Yamada, Takeshi; Osato, Yasukuni; Watanabe, Okosu; Suzuki, Masao; Kawata, Osamu; and Ishihara, Koushi, 4,878,933, Cl. 65-29.000.
Nippondenso Co., Ltd.: *See*—
Tsuzuki, Yukio; and Yamaoka, Masami, 4,879,254, Cl. 437-41.000.
Nishi, Yoshiro: *See*—
Aoyagi, Yoshio; Hirano, Hiroyuki; Kimura, Toshiyuki; Niinuma, Susumu; Yoshioka, Minoru; Haeno, Akira; Sato, Takashi; Nishi, Yoshiro; Watanabe, Yoshihiko; Yokogawa, Fumihiko; Matsumoto, Keiichi; and Ogawa, Youichi, 4,879,705, Cl. 369-32.000.
Nishida, Katsutoshi: *See*—
Komeya, Katsutoshi; Hashimoto, Masahiro; Nishida, Katsutoshi; and Komatsu, Michiyasu, 4,879,263, Cl. 501-97.000.
Nishida, Manabu, to Tokyo Electric Company, Ltd. Label printer. 4,878,771, Cl. 400-70.000.

Nishida, Sumio; Matsuo, Noritada; Hatakoshi, Makoto; and Kisida, Hirosi, to Sumitomo Chemical Company, Limited. Certain-phenoxy-phenoxy-alkylene-oxy-pyrimidines or symmetrical triazines, thio-analogues thereof, having insecticidal activity. 4,879,292, Cl. 514-241.000.

Nishikawa, Hideya: *See*—
Yamane, Yuji; and Nishikawa, Hideya, 4,878,869, Cl. 446-130.000.

Nishikawa, Tetsuo, to Fuji Photo Film Co., Ltd. Web butt splicing device. 4,878,986, Cl. 156-504.000.

Nishikawa, Tetsuo: *See*—
Kambara, Hideki; and Nishikawa, Tetsuo, 4,879,012, Cl. 204-157.150.

Nishikawa, Yukinobu: *See*—
Kasper, Gerhard; Wen, Horng-Yuan; and Nishikawa, Yukinobu, 4,878,510, Cl. 137-1.000.

Nishimoto, Toshihiko: *See*—
Fujio, Yoshiharu; Matsukuma, Kanemasa; and Nishimoto, Toshihiko, 4,879,363, Cl. 526-314.000.

Nishimura, Shigeoki; Fujita, Kazunori; Sugimoto, Hiroyuki; Tohyama, Atsuko; Ebato, Noboru; and Matsuda, Shinpei, to Hitachi Ltd.; and Showa Denka K.K. Secondary cell. 4,879,192, Cl. 429-198.000.

Nishimura, Yoshihide: *See*—
Tachibana, Juro; and Nishimura, Yoshihide, 4,878,279, Cl. 28-203.000.

Nishizato, Hiroshi: *See*—
Sugai, Kazuyoshi; Sato, Kiyotaka; and Nishizato, Hiroshi, 4,879,487, Cl. 310-313.00A.

Nissan Chemical Industries Ltd.: *See*—
Seto, Kiyotomo; Matsumoto, Hiroo; and Sakoda, Ryozo, 4,879,400, Cl. 558-83.000.

Nissan Motor Company: *See*—
Yamagishi, Hirofumi; Segoshi, Tooru; Shigemura, Kouji; Nakata, Yutaka; Yoneyama, Hirokazu; and Yamashita, Mototsugu, deceased, 4,879,636, Cl. 362-61.000.

Nissan Motor Co., Ltd.: *See*—
Hayashi, Yoshimasa; and Tamazawa, Tsuyoshi, 4,878,469, Cl. 123-195.00A.
Kimura, Hitoshi; Kazama, Shigenori; Shirasaka, Akitoshi; Taki, Kiyoshi; and Manabe, Yukihiro, 4,879,325, Cl. 523-404.000.
Makihara, Novuo; Ono, Hiroshi; and Kawamura, Norimasa, 4,878,865, Cl. 440-66.000.
Shibahata, Yasuji; Fukunaga, Yukio; Tsubota, Yasumasa; Uno, Takaaki; and Okuyama, Yuji, 4,878,557, Cl. 180-140.000.
Tamura, Minoru; Katayose, Shinji; Murakami, Terukiyo; and Izumi, Hisashi, 4,879,657, Cl. 364-431.070.

Nissei Jushi Kogyo Kabushiki Kaisha: *See*—
Shimizu, Junichi; and Nakajoh, Tadashi, 4,879,077, Cl. 264-40.100.

Nisshin Flour Milling Co., Ltd.: *See*—
Endo, Shigeru; Nomura, Satoshi; Ishigami, Shinji; and Karibe, Sonoko, 4,879,133, Cl. 426-653.000.

Nisshin Steel Company, Ltd.: *See*—
Hoshino, Kazuo; and Igawa, Takashi, 4,878,955, Cl. 148-12.00E.
Sakai, Nobuhiko; Uchida, Yukio; Wada, Eizo; and Hirose, Yusuke, 4,878,960, Cl. 148-127.000.

Nitta, Kazunari: *See*—
Ishiwata, Ken-ichi; Nakamura, Takeshi; Makiguchi, Nobuyoshi; Miyahara, Shoichiro; Matsumoto, Toshio; and Nitta, Kazunari, 4,879,411, Cl. 562-401.000.

Nitta, Tomio, to Tokai Corporation. Gaslighter structure. 4,878,833, Cl. 431-146.000.

Nitta, Tomio, to Tokai Corporation. Gaslighter structure. 4,878,834, Cl. 431-152.000.

Nitta, Tomio, to Tokai Corporation. Gaslighter structure. 4,878,836, Cl. 431-277.000.

NL Chemicals, Inc.: *See*—
Petschke, Glenn H.; and Taub, Bernard, 4,879,365, Cl. 528-49.000.

Noda, Iwao: *See*—
Miwa, Takeru; and Noda, Iwao, 4,878,914, Cl. 623-16.000.

Noda, Mitsuaki: *See*—
Hongo, Masafumi; and Noda, Mitsuaki, 4,879,329, Cl. 524-114.000.

Noda, Mitsuo: *See*—
Saito, Nobuo; and Noda, Mitsuo, 4,879,332, Cl. 524-436.000.

Nogi, Hiroshi: *See*—
Homma, Kazuya; Nogi, Hiroshi; Yamada, Koichi; Kitazume, Masahiro; Uzawa, Masamitsu; and Aoki, Makoto, 4,878,754, Cl. 356-376.000.

Nohr, Ronald S.: *See*—
MacDonald, J. Gavin; and Nohr, Ronald S., 4,879,232, Cl. 435-179.000.

Noji, Masahide: *See*—
Kidani, Yoshinori; and Noji, Masahide, 4,879,379, Cl. 540-3.000.

Noma, Hiroyuki, to Sumitomo Rubber Industries, Ltd. Wheel rim and assembly of wheel rim and tire. 4,878,527, Cl. 152-379.300.

Nomura, Calvin S.: *See*—
Jove, Stephen A.; Klaassen, Klaas B.; Nomura, Calvin S.; and vanPeppen, Jacobus C. L., 4,879,610, Cl. 360-67.000.

Nomura, Satoshi: *See*—
Endo, Shigeru; Nomura, Satoshi; Ishigami, Shinji; and Karibe, Sonoko, 4,879,133, Cl. 426-653.000.

Norbury, R. James; and Pendergrass, Daniel B., Jr., to Minnesota Mining and Manufacturing Company. Liquid transfer device. 4,878,775, Cl. 401-132.000.

Nordstrom, Arnold, to Ancra Corporation. Cargo handling system. 4,878,635, Cl. 244-137.100.

Norman, Richard O., to Environmental Delivery Systems, Inc. Fluid spray system having a replaceable cartridge. 4,878,619, Cl. 239-318.000.

North American Philips Corp.: *See*—
Latassa, Frank M.; and Wilson, William E., 4,879,492, Cl. 313-487.000.
Rossi, Barbara A.; and Mitra, Udayanath, 4,878,993, Cl. 156-643.000.

Northern Telecom Limited: *See*—
Braham, R. Brian, 4,879,436, Cl. 174-92.000.
Petro, John F., 4,879,738, Cl. 379-3.000.

Northrop Corporation: *See*—
McHenry, Mark A., 4,879,560, Cl. 342-165.000.

Norwalt Design, Inc.: *See*—
McDonald, Walter; and Seitel, Norbert J., 4,878,575, Cl. 198-391.000.

Noto, Nancy C. Toy for conveying personalized message. 4,878,871, Cl. 446-302.000.

Nova Medical Specialties: *See*—
Griffin, Joseph C.; and Skaggs, James L., 4,878,898, Cl. 604-101.000.

Nova-Werke AG: *See*—
Fuchs, Peter, 4,878,471, Cl. 123-446.000.

Novikov, Eduard. Anti-theft system. 4,878,706, Cl. 296-37.100.

Novotny, Rudolph J., to United Technologies Corporation. Triple axis thrust vectoring exhaust nozzle. 4,878,617, Cl. 239-265.350.

Nowak, David J., to General Electric Company. Method for producing three-dimensional images from nuclear data. 4,879,652, Cl. 364-413.180.

Nu-Graphics Engineering, Inc.: *See*—
Russo, Alberto, 4,878,429, Cl. 101-486.000.

Nufer, Robert W.: *See*—
Herron, Lester W.; Lussow, Robert O.; Nufer, Robert W.; Schwartz, Bernard; Acocella, John; and Reddy, Srinivasa N., 4,879,156, Cl. 428-137.000.

Numajiri, Yasuyoshi: *See*—
Hirozumi, Yasuo; Kanematsu, Susumu; Numajiri, Yasuyoshi; Watanabe, Mikio; and Okano, Mitsuhiro, 4,879,491, Cl. 313-318.000.

Nutzel, Oswald; Zimmermann, Egbert; and Jungwirth, Dieter, to Dyckerhoff & Widmann Aktiengesellschaft. Corrosion protected tension member for use in prestressed concrete and method of installing same. 4,878,327, Cl. 52-230.000.

Oatey Company: *See*—
Naton, Paul E., 4,879,096, Cl. 420-561.000.

Oba, Hidehiro: *See*—
Isobe, Toshiaki; and Oba, Hidehiro, 4,878,386, Cl. 73-861.220.

Oba, Hiroyoshi: *See*—
Waku, Yoshiharu; Yoshioka, Hideho; Oba, Hiroyoshi; and Fujino, Kiyoshi, 4,879,074, Cl. 264-24.000.

Obara Corporation: *See*—
Umeda, Shigeru, 4,879,447, Cl. 219-86.250.

Oberhardt, Bruce J.; and Palmer, Phyllis J., to Becton, Dickinson and Company. Device for the separation of the lighter fraction from the heavier fraction of a liquid sample. 4,879,098, Cl. 422-101.000.

Oberle, Timothy T., to W. R. Grace & Co.-Conn. Perforated cook-in shrink bag. 4,879,124, Cl. 426-113.000.

Obikawa, Tsuyoshi: *See*—
Shionozaki, Yoshio; Mukai, Hiroshi; Obikawa, Tsuyoshi; and Yamada, Shuhei, 4,879,060, Cl. 252-299.610.

Objective Golf, Inc.: *See*—
Pollard, Theodore, 4,878,673, Cl. 273-186.00C.

O'Brien, Robert: *See*—
Hippo, Edwin J.; Comolli, Alfred G.; and O'Brien, Robert, 4,879,021, Cl. 208-413.000.

Ochiai, Kiyoshi, to Sumitomo Rubber Industries, Ltd. Radial tire tread having inclined and axial sipes. 4,878,526, Cl. 152-209.00R.

Oda, Yasuyoshi, to Shin Nihon Chemical Industry Co., Ltd. Method for producing a magnesia powder for use as an electrical insulating material. 4,879,101, Cl. 423-163.000.

Odaka, Masanori: *See*—
Miwa, Hideo; Tsuruoka, Kazuhiro; Yamauchi, Koudou; Endoh, Hitoshi; and Odaka, Masanori, 4,879,681, Cl. 365-189.010.

Oesch, Gustav; Gmeiner, Paul; and Hofer, Urs, to Micafil AG. Process for the extraction of oil or polychlorinated biphenyl from electrical parts through the use of solvents and for distillation of the solvents. 4,879,004, Cl. 203-89.000.

Ogata, Taizo; Takahashi, Toyoharu; and Koshiba, Kenji, to Tokyo Automatic Machinery Works, Ltd.; and Japan Tobacco Inc. Apparatus for splicing a replacement web to a web having a programmed movement without interrupting such movement. 4,878,982, Cl. 156-361.000.

Ogawa, Youichi: *See*—
Aoyagi, Yoshio; Hirano, Hiroyuki; Kimura, Toshiyuki; Niinuma, Susumu; Yoshioka, Minoru; Haeno, Akira; Sato, Takashi; Nishi, Yoshiro; Watanabe, Yoshihiko; Yokogawa, Fumihiko; Matsumoto, Keiichi; and Ogawa, Youichi, 4,879,705, Cl. 369-32.000.

Ogontz Controls Company: *See*—
Pirkel, Fred L., 4,878,512, Cl. 137-62.000.

Ohara, Michimasa: *See*—
Hanyuda, Ken; and Ohara, Michimasa, 4,879,762, Cl. 455-601.000.

Ohashi, Masato; and Kodai, Shiyojiro, to Ryoden Kasei Co., Ltd.; and Mitsubishi Denki Kabushiki Kaisha. Integrated circuit card. 4,879,153, Cl. 428-76.000.

Ohata, Yu: *See*—
Takagi, Yosuke; Ohata, Yu; Kitahara, Koichi; and Kuramoto, Tsuyoshi, 4,879,584, Cl. 357-43.000.

Ohkubo, Shouichi: *See*—
Shibasaki, Ken-ichiro; Itoi, Hiroshi; Ohkubo, Shouichi; and Sano, Hiroshi, 4,879,281, Cl. 514-55.000.
Ohkubo, Yukitoshi; Watanabe, Yasuyuki; Mochizuki, Chiori; Ishii, Takayuki; Yamanobe, Masato; and Ishiwata, Kazuya, to Canon Kabushiki Kaisha. Liquid crystal optical modulator. 4,878,742, Cl. 350-347.00V.
Ohlson, Sten, to Perstorp Biolytica. Method and apparatus for isocratic affinity chromatography. 4,879,247, Cl. 436-527.000.
Ohnishi, Tateo: *See*—
Yamaguchi, Yasuhiro; Shimoyama, Yuji; Ohnishi, Tateo; and Ohno, Hironobu, 4,878,961, Cl. 148-128.000.
Ohno, Hironobu: *See*—
Yamaguchi, Yasuhiro; Shimoyama, Yuji; Ohnishi, Tateo; and Ohno, Hironobu, 4,878,961, Cl. 148-128.000.
Ohno, Shigeru: *See*—
Ishigaki, Kunio; Takahashi, Toshiro; Mihara, Yuji; Adachi, Keiichi; Ohno, Shigeru; Okada, Masahiro; and Saeki, Naomi, 4,879,204, Cl. 430-512.000.
Ohsaki, Takanori: *See*—
Arai, Yoshihiro; Sasaki, Kouji; and Ohsaki, Takanori, 4,879,552, Cl. 340-870.370.
Ohtaka, Kazuto: *See*—
Yamade, Kenichi; Nakashima, Sukeyoshi; Inaba, Shigemitsu; and Ohtaka, Kazuto, 4,878,853, Cl. 439-144.000.
Ohtake, Etsuo; Yamaki, Kaoru; and Kuroda, Takayuki, to Daicel Chemical Industries, Ltd. Process for producing a thin resin film. 4,878,973, Cl. 156-85.000.
Ohtsuka, Akira; Goto, Tomoji; and Ida, Masao, to Sumitomo Electric Industries, Ltd.; and Nippon Telegraph and Telephone Corporation. Integrated circuit package. 4,879,588, Cl. 357-68.000.
Oien, Michael A.: *See*—
LoVasco, Francis; and Oien, Michael A., 4,878,611, Cl. 228-180.200.
Oikawa, Takahiro: *See*—
Takashima, Makoto; Aoki, Yoshihito; and Oikawa, Takahiro, 4,879,658, Cl. 364-449.000.
Oji Paper Co., Ltd.: *See*—
Toyofuku, Kunitaka; Sato, Hiroaki; and Michikawa, Kohei, 4,879,195, Cl. 430-89.000.
Oka, Yutaka, to Fuji Photo Film Co., Ltd. Light-sensitive material containing silver halide, reducing agent, polymerizable compound, and a quaternary ammonium development accelerator. 4,879,200, Cl. 430-138.000.
Okabayashi, Ichiro: *See*—
Okamoto, Tadashi; Kadota, Hiroshi; Miyake, Jiro; Okabayashi, Ichiro; and Maeda, Yoshinori, 4,879,687, Cl. 365-200.000.
Okada, Haruo: *See*—
Takahashi, Hiroaki; Okada, Haruo; Matsumoto, Katsuya; and Umino, Masuo, 4,879,039, Cl. 210-635.000.
Okada, Masahiro: *See*—
Ishigaki, Kunio; Takahashi, Toshiro; Mihara, Yuji; Adachi, Keiichi; Ohno, Shigeru; Okada, Masahiro; and Saeki, Naomi, 4,879,204, Cl. 430-512.000.
Okada, Masao; Sakai, Kazuhiko; Kimura, Haruo; and Ikada, Yoshito. Synthetic vascular prosthesis. 4,878,907, Cl. 623-1.000.
Okamoto, Ichiro: *See*—
Namikoshi, Hajime; Shibata, Tohru; and Okamoto, Ichiro, 4,879,038, Cl. 210-635.000.
Okamoto, Kei. Retractable legrest for dental chair. 4,878,709, Cl. 297-68.000.
Okamoto, Keiji: *See*—
Inoue, Tai; Sugita, Masaya; and Okamoto, Keiji, 4,878,453, Cl. 116-288.000.
Okamoto, Shigeo: *See*—
Fukui, Kumiko; Doumura, Tatsuaki; and Okamoto, Shigeo, 4,879,611, Cl. 360-69.000.
Okamoto, Tadashi; Kadota, Hiroshi; Miyake, Jiro; Okabayashi, Ichiro; and Maeda, Yoshinori, to Matsushita Electric Industrial Co., Ltd. Memory device having valid bit storage units to be reset in batch. 4,879,687, Cl. 365-200.000.
Okamura, Kiyohito: *See*—
Hasegawa, Yoshio; and Okamura, Kiyohito, 4,879,334, Cl. 525-474.000.
Okano, Haruo: *See*—
Arikado, Tsunetoshi; Sekine, Makoto; Okano, Haruo; and Horiike, Yasuhiro, 4,878,995, Cl. 156-643.000.
Okano, Mitsuhiro: *See*—
Hirozumi, Yasuo; Kanematsu, Susumu; Numajiri, Yasuyoshi; Watanabe, Mikio; and Okano, Mitsuhiro, 4,879,491, Cl. 313-318.000.
Oki Electric Industry Co., Ltd.: *See*—
Kobayashi, Masaki; Itoh, Yoshio; and Kusaka, Hiroji, 4,879,726, Cl. 375-1.000.
Wakamatsu, Hidetoshi, 4,879,253, Cl. 437-41.000.
Okino, Tadashi: *See*—
Ise, Makoto; and Okino, Tadashi, 4,879,600, Cl. 358-213.190.
Okita, Kiyomi: *See*—
Karasawa, Hiroo; Kometani, Kiichi; and Okita, Kiyomi, 4,879,328, Cl. 524-109.000.
Okouchi, Isao: *See*—
Kurokawa, Hideaki; Yamada, Akira; Koseki, Yasuo; Matsuzaki, Harumi; Ebara, Katsuya; Takahashi, Sankichi; Yoda, Hiroaki; Hayashi, Nobuatsu; Okouchi, Isao; Hishinuma, Yukio; and Momma, Naohiro, 4,879,041, Cl. 210-640.000.
Oku, Shosuke: *See*—
Hirota, Fumio; Kado, Tsutomu; Oku, Shosuke; and Watanabe, Noboru, 4,879,335, Cl. 524-495.000.
Okuyama, Yuji: *See*—
Shibahata, Yasuji; Fukunaga, Yukio; Tsubota, Yasumasa; Uno, Takaaki; and Okuyama, Yuji, 4,878,557, Cl. 180-140.000.
Olin Corporation: *See*—
Winter, Joseph; and Pryor, Michael J., 4,878,733, Cl. 350-96.230.
Olin Hunt Specialty Products Inc.: *See*—
Bujese, David P.; and Schmidt, Gary W., 4,879,184, Cl. 430-126.000.
Oliphant, Adam L. Portable barbecue grill assembly. 4,878,476, Cl. 126-9.00R.
Oliver, Joseph J.: *See*—
Hansen, Loren F.; Huber, Donald J., deceased; and Oliver, Joseph J., 4,878,802, Cl. 414-523.000.
Olsen, Floyd W., to International Business Machines Corporation. Bi-directional circuit to interface between a low current device and high current tester. 4,879,661, Cl. 364-483.000.
Olsen, Gordon E.: *See*—
Effland, Richard C.; Davis, Larry; Kapples, Kevin J.; and Olsen, Gordon E., 4,879,382, Cl. 540-554.000.
Olympus Optical Co., Ltd.: *See*—
Akatsuka, Yuichiro, 4,879,665, Cl. 364-518.000.
Gotanda, Masakazu, 4,879,528, Cl. 331-4.000.
Nakano, Hiroshi; Takeuchi, Toyoaki; Tsunoda, Toshiyuki; and Kinukawa, Masahiko, 4,878,746, Cl. 350-507.000.
Omaki, Takanobu: *See*—
Kikukawa, Yoshiiku; Nakasa, Masayuki; Yoshida, Tadahiro; Kitaura, Mashio; Nakai, Masaaki; Omaki, Takanobu; and Taniguchi, Nobuyuki, 4,878,751, Cl. 354-410.000.
Omron Tateisi Electronics Co.: *See*—
Ishii, Hiroaki, 4,879,649, Cl. 364-405.000.
Matsuoka, Kazushige, 4,878,860, Cl. 439-716.000.
Tasaki, Hisashi; and Endo, Kimikazu, 4,879,744, Cl. 379-144.000.
Omura, Takashi: *See*—
Morimitsu, Toshihiko; Harada, Naoki; and Omura, Takashi, 4 879,372, Cl. 534-618.000.
O'Neill, Christopher, to Royal North Shore Hospital and Area Health Service, a part interest. Fertility control. 4,879,285, Cl. 514-75.000.
O'Neill, Edward L., to Lucasey Manufacturing Company, Inc. Appliance retaining adaptor. 4,878,645, Cl. 248-680.000.
Ono, Hiroshi: *See*—
Makihara, Novuo; Ono, Hiroshi; and Kawamura, Norimasa, 4,878,865, Cl. 440-66.000.
Ono, Izumi: *See*—
Yamamoto, Haruhiko; Suzuki, Masahiro; Udagawa, Yoshiaki; Nakata, Mitsuhiko; Katsuyama, Koji; Ono, Izumi; and Kikuchi, Shunichi, 4,879,632, Cl. 361-386.000.
Ono, Shizumi: *See*—
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Ono, Tetsuo: *See*—
Mastuno, Hiromistu; Murayama, Seiichi; Ono, Tetsuo; and Watanabe, Yoshio, 4,879,493, Cl. 313-641.000.
Onuki, Kazuhiko; Maetani, Masami; Ito, Masahiko; and Murata, Shinji, to Canon Kabushiki Kaisha. Reader-printer. 4,879,572, Cl. 355-45.000.
Ootani, Takayuki: *See*—
Suzuki, Azuma; Ootani, Takayuki; and Isobe, Mitsuo, 4,879,686, Cl. 365-189.110.
Ootsuka, Yoshinori; Atsumi, Kinya; Arai, Masumi; and Hattori, Tadashi, to Nippon Soken, Inc. Method of making a thin film electroluminescence element. 4,879,139, Cl. 427-38.000.
Ophir, Jonathan; and Shattuck, David P., to University of Texas System, The; and University of Houston-University Park, The. Multibeam tracking for angle error correction in speed of sound estimations. 4,878,500, Cl. 128-660.010.
Ophthalmic Research Group International, Inc.: *See*—
Lipscomb, N. Thornton; and Buazza, Omar M., 4,879,318, Cl. 522-42.000.
Optische Werke G. Rodenstock: *See*—
Hanke, Peter; and Postanschrift, Wie, 4,878,720, Cl. 350-6.400.
O'Quinn, Alethea H.: *See*—
Presswood, J. Kenneth; and O'Quinn, Alethea H., 4,879,182, Cl. 428-408.000.
Orestano, Andrew J. Sportboard wall-display safety-hanger fixture. 4,878,585, Cl. 211-87.000.
Orlandini, George. Binder for telephone directories and the like. 4,878,776, Cl. 402-4.000.
Orquera, Henri; and Jennequin, Gerard, to Constructions Industrielles de la Mediterranee. Suspension system for cylindrical elements in containers. 4,878,416, Cl. 89-1.810.
Orr, Norman A.; and Greenway, Michael J., to Beecham Group p.l.c. Pharmaceutical composition. 4,879,287, Cl. 514-171.000.
Ortho Pharmaceutical Corporation: *See*—
Schwender, Charles F.; and Dodd, John H., 4,879,384, Cl. 546-114.000.
Osaka, Syuichi: *See*—
Mori, Ryuichiro; Osaka, Syuichi; and Banjo, Toshinobu, 4,878,610, Cl. 228-6.200.
Osanai, Yasuhiko: *See*—
Sano, Yasuro; Koide, Akio; Hyodo, Toru; Kobayashi, Fumihiko; Kawasato, Takayuki; and Osanai, Yasuhiko, 4,878,444, Cl. 112-264.100.

Osato, Yasukuni: *See—*
Yamada, Takeshi; Osato, Yasukuni; Watanabe, Okosu; Suzuki, Masao; Kawata, Osamu; and Ishihara, Koushi, 4,878,933, Cl. 65-29.000.
Oscar Mayer Foods Corporation: *See—*
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Ostertag, Alfred; Iversen, Robert E.; Hyland, Craig R.; Enever, Kenneth D.; and Radford, Steven R., to Eastman Christensen. Nozzle retention system for a drill bit. 4,878,548, Cl. 175-340.000.
Ostrander, Paul R., to Valmet-Sentrol Ltd. Paste hopper control system. 4,878,522, Cl. 141-11.000.
Otokawa, Mitsuhiro: *See—*
Kozuki, Susumu; Takahashi, Koji; Satoh, Keiji; Nagasawa, Kenichi; Edakubo, Hiroo; and Otokawa, Mitsuhiro, 4,879,609, Cl. 360-66.000.
Otsuka, Nobauki: *See—*
Atsumi, Shigeru; Tanaka, Sumio; Saito, Shinji; and Otsuka, Nobauki, 4,879,689, Cl. 365-201.000.
Otto, Friedrich, to A. Stephen u. Soehne GmbH & Co. Kitchen appliance. 4,878,627, Cl. 241-199.120.
Otto, Nancy M., to Carrier Corporation. Infrared burner. 4,878,837, Cl. 431-328.000.
Ouderkirk, Andrew J.; Dunn, Douglas S.; and Warner, Robert W., to Minnesota Mining and Manufacturing Company. Surface modification of semicrystalline polymers. 4,879,176, Cl. 428-323.000.
Ourmazd, Abbas: *See—*
Bean, John C.; and Ourmazd, Abbas, 4,879,256, Cl. 437-131.000.
Outboard Marine Corporation: *See—*
Hansen, Loren F.; Huber, Donald J., deceased; and Oliver, Joseph J., 4,878,802, Cl. 414-523.000.
Ovens, Melvin L. Power sander. 4,878,317, Cl. 51-170.0TL.
Owen, Hartley: *See—*
Harandi, Mohsen N.; and Owen, Hartley, 4,879,428, Cl. 585-533.000.
Owens-Illinois Closure Inc.: *See—*
Barriac, Jacques J., 4,878,604, Cl. 222-209.000.
Owens, Robert W. Baggage inspection conveyor baffle and method. 4,879,735, Cl. 378-57.000.
Owens, William R.: *See—*
Jones, Gregory D.; Owens, William R.; Thiel, Clifford G.; and Danby, Clive M., 4,879,624, Cl. 361-65.000.
Oy Tampella Ab: *See—*
Snellman, Yrjo ; and Rantala, Mauri, 4,879,002, Cl. 162-273.000.
Oyamada, Takashi: *See—*
Matsumoto, Takeshi; Oyamada, Takashi; and Hayasaka, Sigeki, 4,879,759, Cl. 455-348.000.
Ozaki, Hiroshi: *See—*
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Ozeki, Hiromi: *See—*
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Ozero, Brian J., to Scientific Design Company, Inc. Selective extraction of CO_2 and argon from ethylene oxide recycle system. 4,879,396, Cl. 549-534.000.
Pabst, Carsten: *See—*
Berding, Josef; Bertling, Hannes; Lees, Thomas; and Pabst, Carsten, 4,878,519, Cl. 138-31.000.
Pacault, Michel E.; and Gallet, Jean-Jacques E. Device for receiving and securing loads or vehicle hooking systems. 4,878,634, Cl. 244-115.000.
Pacesetter Infusion, Ltd.: *See—*
Garrison, Michi E.; and Pelmulder, John P., 4,878,896, Cl. 604-65.000.
Pachaly, Bernd: *See—*
Fey, Volker; Pachaly, Bernd; and Zeller, Norbert, 4,879,142, Cl. 427-227.000.
Pachmayr Ltd.: *See—*
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Pagliarin, Roberto: *See—*
Chiarino, Dario; Della Bella, Davide; Jommi, Giancarlo; Badone, Domenico; Pagliarin, Roberto; and Tavecchia, Paolo, 4,879,068, Cl. 260-397.000.
Pak, Tong S. Sandwich in a lunch box. 4,879,125, Cl. 426-120.000.
Palfreyman, Michael G.: *See—*
McDonald, Ian A.; Palfreyman, Michael G.; and Collard, Jean-Noel, 4,879,305, Cl. 514-419.000.
Palmer, Phyllis J.: *See—*
Oberhardt, Bruce J.; and Palmer, Phyllis J., 4,879,098, Cl. 422-101.000.
Panetti, Romolo, to Speno International S.A. Railway track maintenance machine for the rectification of the head of the rail. 4,878,318, Cl. 51-178.000.
Pankatz, Manfred, to Deutsche Rockwool Mineralwoll GmbH. Plate made of insulating material, in particular mineral fibers. 4,879,157, Cl. 428-157.000.
Pantelleria, James E.: *See—*
Schreckendgust, Jay G.; Pantelleria, James E.; and Bergeron, Mark M., 4,879,734, Cl. 378-57.000.
Panzani, Ivo, to Dideco S.p.A. Blood centrifugation cell. 4,879,031, Cl. 210-360.200.
Paquette, Edmund T.; and Beam, John W., to Wright Line, Inc. Storing and dispensing system. 4,878,583, Cl. 211-41.000.
Parkerson, James P.: *See—*
Luckett, Dirk R.; and Parkerson, James P., 4,879,680, Cl. 365-154.000.
Parnigoni, Rudolf. Method of forming a net-like structure. 4,879,084, Cl. 264-295.000.
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Harrison, John R.; Lehr, Gary L.; Parr, Dennis J.; Ward, William F., Jr.; and Wells, Robert R., 4,878,407, Cl. 83-13.000.
Parravacini, Roberto. High efficiency cardiac valve. 4,878,909, Cl. 623-2.000.
Pasternak, Eliezer; Drews, Robert C.; and Shalon, Tadmor, to Ninetronix Venture I. Hand-held diathermy apparatus. 4,878,493, Cl. 128-303.140.
Pastor, Vincente N., to Vicma, S.A. All-fours walking doll. 4,878,870, Cl. 446-298.000.
Pathak, Jagdish; Douglass, Stephen M.; and Vider, Dov-Ami, to Cypress Semiconductor Corporation. Dual I/O macrocell for high speed synchronous state machine. 4,879,481, Cl. 307-465.000.
Patil, Ashok D., to Harbor Branch Oceanographic Institution, Inc. Dioxolane antibacterial compositions. 4,879,307, Cl. 514-467.000.
Paton, Anthony D.: *See—*
Bartky, W. Scott; Paton, Anthony D.; Temple, Stephen; and Michaelis, A. John, 4,879,568, Cl. 346-140.00R.
Patrick, John L.: *See—*
Mehdizadeh, Mehrdad; Patrick, John L.; and Misic, George J., 4,879,516, Cl. 324-318.000.
Patrick, Roger, to LSI Logic Corporation. Planarization process. 4,879,257, Cl. 437-195.000.
Patricy, Henry R. Securement system. 4,878,274, Cl. 24-306.000.
Paul Pleiger Maschinenfabrik GmbH & Co.: *See—*
Strassheimer, Herbert, 4,878,648, Cl. 251-63.000.
Paul, Robert M.: *See—*
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Paul, Winfried: *See—*
Kress, Hans-Jurgen; Paul, Winfried; Peters, Horst; Lindner, Christian; and Buekers, Josef, 4,879,342, Cl. 525-67.000.
Paul Wurth S.A.: *See—*
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Paulsen, Dean R., to General Scanning, Inc. Resonant mechanical system. 4,878,721, Cl. 350-6.600.
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Schade, Gerold; Paulus, Wilfried; and Schmitt, Hans-Georg, 4,879,310, Cl. 514-519.000.
Pausch, Guenther, to Siemens Aktiengesellschaft. Magnet system for nuclear magnetic resonance tomography devices. 4,879,538, Cl. 335-298.000.
Pavelin, Ernest J., to Thorn EMI plc. Spotlight arrangement. 4,879,638, Cl. 362-294.000.
Pavlansky, Rudolf; and Petrtyl, Miroslay, to Ceske Vysoke Uceni Technicke. Artificial hip endo-limb. 4,878,919, Cl. 623-23.000.
Pawski, Rolf P., to CBI Research Corporation. Structural panels for walls, floors and roofs having exterior metal layers and an insulating concrete core. 4,878,329, Cl. 52-245.000.
Payne, Beverley: *See—*
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Pearson, Rune S., to Invention Design Engineering Associates, Inc. Machine for handling circuit package storage tubes. 4,878,801, Cl. 414-411.000.
Peck, James V.: *See—*
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Peco Controls Corporation: *See—*
Sommerfield, John R., 4,878,333, Cl. 53-53.000.
Pedersen, Palle. Horseshoe, especially for trotting horses. 4,878,541, Cl. 168-4.000.
Pelmulder, John P.: *See—*
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Pendergrass, Daniel B., Jr.: *See—*
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Penninger, Stefan: *See—*
Knofel, Hartmut; Brockelt, Michael; Penninger, Stefan; and Stutz, Herbert, 4,879,408, Cl. 560-330.000.
Knofel, Hartmut; Brockelt, Michael; Penninger, Stefan; and Stutz, Herbert, 4,879,409, Cl. 560-330.000.
Pennline, Henry W.: *See—*
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Pepinsky, R. Blake: *See—*
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Perciful, Jerry C.: *See—*
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Getman, Daniel P.; Periana, Roy A.; and Riley, Dennis P., 4,879,398, Cl. 556-413.000.
Perillo, Andrea: *See—*
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Periot, Jean-Marie: *See—*
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Permian Research Corporation: *See—*
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Pernick, Jeffrey: *See—*
Fenoglio, Charles; Kljucaricek, Peter; Pernick, Jeffrey; and Schaedel, Fred C., 4,879,018, Cl. 204-56.100.

Perrotti, Patrick A.; Joffre, Paul F.; Karoutas, Zeses E.; Corsetti, Lawrence V.; Bryan, William J.; and Hatfield, Stephen C., to Combustion Engineering, Inc. Split vaned nuclear fuel assembly grid. 4,879,090, Cl. 376-462.000.

Perry, David S.: *See—*
Toutant, Roy T.; Perry, David S.; Brennan, Michael A.; Kreko, James E.; and Dilk, Mark A., 4,878,368, Cl. 72-9.000.

Perry, Leroy: *See—*
Perry, Timothy; and Perry, Leroy, 4,878,675, Cl. 273-251.000.

Perry, Timothy; and Perry, Leroy. Educational and amusement game. 4,878,675, Cl. 273-251.000.

Perstorp Biolytica: *See—*
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Persyk, Dennis E.; and Hamill James J., to Siemens Gammasonics, Inc. Detector module for scintillation cameras. 4,879,465, Cl. 250-363.020.

Peters, Horst: *See—*
Kress, Hans-Jurgen; Paul, Winfried; Peters, Horst; Lindner, Christian; and Buekers, Josef, 4,879,342, Cl. 525-67.000.

Peters, Karl-Clemens: *See—*
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Petersen, Eric A.: *See—*
Jamison, Chris M.; and Petersen, Eric A., 4,878,622, Cl. 239-690.100.

Petersen, Frank P.; Grothaus, Gary D.; and Miller, Sally A., to Agri-Diagnostics Associates. Test for Rhizoctonia brown and yellow patch. 4,879,217, Cl. 435-7.000.

Petit, Pierre: *See—*
Leonard, Didier; Periot, Jean-Marie; and Petit, Pierre, 4,879,512, Cl. 324-207.000.

Peton, Denise: *See—*
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Petri, Gunther: *See—*
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Petro, John F., to Northern Telecom Limited. Digital telephony card for use in an operator system. 4,879,738, Cl. 379-3.000.

Petrtyl, Miroslay: *See—*
Pavlansky, Rudolf; and Petrtyl, Miroslay, 4,878,919, Cl. 623-23.000.

Petschke, Glenn H.; and Taub, Bernard, to NL Chemicals, Inc. High preformance one-component urethane compositions with excellent weathering properties and method for making and using same. 4,879,365, Cl. 528-49.000.

Pettit, George R.; and Kamano, Yoshiaki, to Arizona Board of Regents. Isolation and structural elucidation of the cytostatic linear depsipeptide dolastatin 15. 4,879,278, Cl. 514-17.000.

Petty, Herbert E.: *See—*
Foster, George N.; Petty, Herbert E.; and Blevins, Charles H., II, 4,879,378, Cl. 556-439.000.

Peyman, Gholam A.: *See—*
Koziol, Jeffrey E.; and Peyman, Gholam A., 4,878,910, Cl. 623-6.000.

Peyremorte, Jean-Pierre: *See—*
Gibot, Claude; Peyremorte, Jean-Pierre; and Sojka, Richard, 4,878,353, Cl. 62-52.100.

Pfeffer, John D., to A. O. Smith Corporation. Insulated fluid storage unit and method of making. 4,878,482, Cl. 126-375.000.

Pfizer Hospital Products Group, Inc.: *See—*
Aebischer, Patrick; Valentini, Robert F.; and Galletti, Pierre M., 4,878,913, Cl. 623-12.000.

Pfizer Inc.: *See—*
Davison, Edward; and Wells, James I., 4,879,303, Cl. 514-356.000.
Howard, Harry R., Jr.; and Sarges, Reinhard, 4,879,391, Cl. 548-486.000.

Phade, Ravindra F.; and Handley, James R., to Union Carbide Corporation. Cryogenic rectification process for separating nitrogen and methane. 4,878,932, Cl. 62-24.000.

Philipp, Harald. Energy field sensor using summing means. 4,879,461, Cl. 250-221.000.

Phillips, Gerald W.: *See—*
Puckette, Thomas A.; Devon, Thomas J.; Phillips, Gerald W.; and Stavinoha, Jerome L., 4,879,416, Cl. 568-13.000.

Phillips, James L.; Richardson, Dale W.; and Hill, J. Donald, to International Research & Development Corporation. Cardio-valve assist unit and method for performing cardio-valve replacement surgery. 4,878,494, Cl. 128-334.00R.

Phillips Petroleum Company: *See—*
Kukes, Simon G.; Banks, Robert L.; and Harris, Jesse R., 4,879,425, Cl. 585-350.000.
Stroman, David W.; Cregg, James M.; Harpold, Michael M.; and Sperl, George T., 4,879,231, Cl. 435-172.300.

Photo Redux Corp.: *See—*
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Picker International, Inc.: *See—*
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Pickering, William: *See—*
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Picone, Joseph; and Prezas, Dimitrios, to American Telephone and Telegraph Company; and AT&T Bell Laboratories. Parallel processing pitch detector. 4,879,748, Cl. 381-49.000.

Piejko, Karl-Erwin; Bomer, Bruno; Buysch, Hans-Josef; and Hullmann, Michael, to Bayer Aktiengesellschaft. Process for the preparation of aliphatic polycarbonates with alkoxy silane initiator. 4,879,367, Cl. 528-371.000.

Pierschbacher, Michael D.: *See—*
Rudslahti, Eric I.; Hayman, Edward G.; and Pierschbacher, Michael D., 4,879,237, Cl. 435-240.200.

Pifferi, Giorgio: *See—*
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Pilgrim's Pride Corporation: *See—*
Rich, Arthur R., 4,879,033, Cl. 210-396.000.

Pillhoefer, Horst, to MTU Motoren-und Turbinen-Union Muenchen GmbH. Process for heat treating cast nickel alloys. 4,878,952, Cl. 148-1.000.

Pin-Hung, Lin; and Kao-Hsien, Yu. Novel climbing toy. 4,878,875, Cl. 446-356.000.

Pinck, Peter; Lorenzen, Heinz-Christen; Heitmann, Uwe; and Siems, Wolfgang, to Korber AG. Method of and apparatus for treating accumulations of fibers of tobacco or other smokable material. 4,878,506, Cl. 131-84.400.

Pioneer Electronic Corporation: *See—*
Aoyagi, Yoshio; Hirano, Hiroyuki; Kimura, Toshiyuki; Niinuma, Susumu; Yoshioka, Minoru; Haeno, Akira; Sato, Takashi; Nishi, Yoshiro; Watanabe, Yoshihiko; Yokogawa, Fumihiko; Matsumoto, Keiichi; and Ogawa, Youichi, 4,879,705, Cl. 369-32.000.
Honda, Tsutomu, 4,879,599, Cl. 358-138.000.

Pirkel, Fred L., to Ogontz Controls Company. Valve mechanism. 4,878,512, Cl. 137-62.000.

Pirolli, Claude, to Telecommunications Radioelectriques et Telephoniques. Device for neutralizing military objects. 4,878,433, Cl. 102-384.000.

Pittalis, Francesco; Bartoli, Francesco; and Farias, Otello, to Eniricerche, S.p.A. Asymmetrical membrane of polyester-amide and process for preparing it. 4,879,036, Cl. 210-500.380.

Plank, Friedrich W.; Machnig, Helmut; Mischke, Georg H.; Friedrichs, Reinhard; and Nahrmann, Norbert, to Rheinisch-Westfalische Kalwerke AG. Process and device for mechanically removing the surface of lumped goods. 4,878,623, Cl. 241-5.000.

Plank, Uto; Neumaier, Anton; and Manschitz, Erwin, to Hilti Aktiengesellschaft. Variably operable hand-held device. 4,878,679, Cl. 279-19.400.

Plantronics, Inc.: *See—*
Young, Robert F.; and Kraz, Vladimir, 4,879,746, Cl. 379-399.000.

Plasscheart, Paul E., to Delphax Systems. Duplex printing device. 4,879,571, Cl. 355-26.000.

Plastic Technologies, Inc.: *See—*
Uhlig, Albert R., 4,878,595, Cl. 220-306.000.

Plempel, Manfred: *See—*
Elbe, Hans-Ludwig; Buchel, Karl H.; Schaller, Klaus; and Plempel, Manfred, 4,879,385, Cl. 514-383.000.

Plessey Overseas Limited: *See—*
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Plicon Corporation: *See—*
Hoffman, Kenneth, 4,879,430, Cl. 428-35.100.

Plouff, Frederick L. Disposable syringe for one-time use. 4,878,899, Cl. 604-110.000.

Pneumafil Corporation: *See—*
Goodrich, Robert L., 4,878,926, Cl. 55-294.000.

Pochard, Guy; and Steiner, Creighton, to A & L Laboratories, Inc. Low-foaming alkaline, hypochlorite cleaner. 4,878,951, Cl. 134-22.170.

Podszun, Wolfgang: *See—*
Reiners, Jurgen; Podszun, Wolfgang; Winkel, Jens; Suling, Carlhans; and Klein, Gerhard, 4,879,402, Cl. 560-26.000.

Poisson, Pierre; Rivas, Nadine; and Deloy, Pierre, to Atochem. New phosphorous acid salts, compositions containing them, and their application as fireproofing agents. 4,879,327, Cl. 524-93.000.

Pokorny, Antonin: *See—*
Puschel, Petr; Formanek, Zdenek; Krivanek, Vaclav; Pokorny, Antonin; Vlasakova, Anna; and Stuchikova, Alena, 4,879,246, Cl. 436-145.000.

Polaroid Corporation: *See—*
Buck, Arnold L.; and Green, Allan C., 4,879,601, Cl. 358-213.220.
Ernest, Paul W., 4,879,592, Cl. 358-42.000.

Polesel, Giampaolo, to RESMA S.R.l. Container assembly. 4,878,313, Cl. 47-87.000.

Pollard, Theodore, to Objective Golf, Inc. Golf club swing training method. 4,878,673, Cl. 273-186.00C.

Pollich, Gerhard, to Heidelberger Druckmaschinen AG. Sheet delivery device in a printing machine. 4,878,658, Cl. 271-183.000.

Polyak, Mark, to American Medical Systems, Inc. Artificial sphincter device. 4,878,889, Cl. 600-31.000.

Polyplastics Co., Ltd.: *See—*
Endo, Toshihiko; and Matsunaga, Nobuyuki, 4,879,331, Cl. 524-267.000.
Taniguchi, Kotaro; Konishi, Toshio; Shimura, Takehiko; Tanimoto, Shigekazu; and Nedzu, Shigeru, 4,879,085, Cl. 264-564.000.

Polysar Limited: *See*—
Fulton, Janet B.; and Edwards, Philip D., 4,879,352, Cl. 525-329.300.

Polytronics, Inc.: *See*—
Bertsch, Jack E.; and Kopp, Harold P., 4,878,852, Cl. 439-103.000.

Polz, M. H., to Dentsply G.m.b.H. Method of applying opaque dental ceramic material to a metal structure. 4,879,136, Cl. 427-2.000.

Pombrio, Philip R., Jr., to Control Data Corporation. Method and apparatus for testing runout velocity and acceleration on a surface. 4,879,672, Cl. 364-566.000.

Pommrehn, Mark R.: *See*—
Kroll, Mark W.; and Pommrehn, Mark R., 4,879,760, Cl. 455-605.000.

Pond, Jacob: *See*—
Thomsen, Karl V.; Darcy, John J.; Griswold, Augustus W.; Haritonoff, Boris W.; and Pond, Jacob, 4,878,985, Cl. 156-459.000.

Port, Gary L.; and Kaelin, John J., to Huck Manufacturing Company. Shock-absorbing fluid-actuated fastener installation tool. 4,878,372, Cl. 72-391.000.

Porter, James L. Receptacle cover for prevention loss of trays with trash. 4,878,590, Cl. 220-1.00T.

Portuese, Peter. Child proof seat belt restraint. 4,878,277, Cl. 24-633.000.

Postanschrift, Wie: *See*—
Hanke, Peter; and Postanschrift, Wie, 4,878,720, Cl. 350-6.400.

Potenzone, Richard A. Voltage monitor. 4,879,625, Cl. 361-90.000.

Potier, Pierre: *See*—
Delevallee, Francoise; and Potier, Pierre, 4,879,298, Cl. 514-282.000.

Potucek, Frank R., to Hall, John W., Jr. Collated screw fasteners. 4,878,794, Cl. 411-395.000.

Powers, Phillip G.: *See*—
McCullough, Nancy J.; Schukman, Jacob E.; and Powers, Phillip G., 4,878,422, Cl. 99-323.400.

Powers, William J., III: *See*—
Matthews, Leonard A.; Powers, William J., III; Przybyla, Henry M.; Whittle, Joanne R.; and Perciful, Jerry C., 4,879,053, Cl. 252-25.000.

Powerscreen International Limited: *See*—
Mallaghan, Michael L., 4,879,023, Cl. 209-241.000.

PPG Industries, Inc.: *See*—
Austin, Henry T., 4,879,013, Cl. 204-180.200.
Connelly, Bruce A.; Wehrle, Matthew E.; and Greigger, Paul P., 4,879,345, Cl. 525-104.000.
Kinney, Jerry N., 4,879,009, Cl. 204-98.000.

Prandi, Bernard: *See*—
Alheritiere, Edouard; and Prandi, Bernard, 4,878,966, Cl. 148-421.000.
Dubertret, Alain; and Prandi, Bernard, 4,878,954, Cl. 148-11.50F.

Prange, Charles J., to Sewer Rodding Equipment Co. High pressure hose pulsation attachment. 4,878,517, Cl. 137-355.120.

Premysl, Jaroslav. Bingo card marker. 4,878,669, Cl. 273-148.00R.

Prescher, Gunter: *See*—
Dankowski, Manfred; Lieser, Thomas; Prescher, Gunter; Leonhardt, Wolfgang; and Diehl, Manfred, 4,879,057, Cl. 252-99.000.

President and Fellows of Harvard College: *See*—
Alderman, Edward M.; Fett, James W.; and Vallee, Bert L., 4,879,222, Cl. 435-68.000.

Presswood, J. Kenneth; and O'Quinn, Alethea H., to Ethyl Corporation. Method of coating carbon bodies. 4,879,182, Cl. 428-408.000.

Preti, George: *See*—
Cutler, Winnifred B.; Preti, George; and Huggins, George R., 4,879,244, Cl. 436-65.000.

Prezas, Dimitrios: *See*—
Picone, Joseph; and Prezas, Dimitrios, 4,879,748, Cl. 381-49.000.

Prince Corporation: *See*—
Clark, Russell L.; Van Order, Kim L.; Suman, Michael J.; and Zandbergen, Todd A., 4,879,637, Cl. 362-141.000.

Prince, Paul R.; Ford, Michael G.; Schoendorfer, Donald W.; and Clark, Ronald L., to Baxter International Inc. Adaptive filter concentrate flow control system and method. 4,879,040, Cl. 210-637.000.

Print Kiko Co., Ltd.: *See*—
Mizutani, Mario, 4,878,981, Cl. 156-356.000.

Priser, James A.: *See*—
Wear, Boyd A.; Latham, Craig V.; and Priser, James A., 4,878,533, Cl. 164-16.000.

Process Automation Business, Inc.: *See*—
Reed, Gordon K., 4,879,003, Cl. 162-344.000.

Process Automation Int'l Ltd.: *See*—
Wong, Chi W., 4,879,007, Cl. 204-15.000.

Procter & Gamble Company, The: *See*—
Mullane, William I., Jr., 4,878,825, Cl. 425-290.000.

Proulx, Pierre R.: *See*—
Morand, Peter; Drew, Jacinta; Szabo, Arthur G.; and Proulx, Pierre R., 4,879,069, Cl. 260-397.200.

Pryor, Michael J.: *See*—
Winter, Joseph; and Pryor, Michael J., 4,878,733, Cl. 350-96.230.

Pryslak, August J., to Valve Alert Systems, Inc. Gas zone valve emergency alarm system. 4,879,547, Cl. 340-686.000.

Przybyla, Henry M.: *See*—
Matthews, Leonard A.; Powers, William J., III; Przybyla, Henry M.; Whittle, Joanne R.; and Perciful, Jerry C., 4,879,053, Cl. 252-25.000.

Psaltopoulos, Emmanuel, to Hydro Energy Systems, Ltd. Process for conditioning liquid petroleum. 4,878,624, Cl. 241-29.000.

Puckette, Thomas A., to Eastman Kodak Company. Preparation of bidentate ligands. 4,879,008, Cl. 204-72.000.

Puckette, Thomas A.; Devon, Thomas J.; Phillips, Gerald W.; and Stavinoha, Jerome L., to Eastman Kodak Company. Preparation of bidentate ligands. 4,879,416, Cl. 568-13.000.

Pulaski Furniture Corporation: *See*—
Kelly, James H., 4,879,701, Cl. 368-136.000.

Punches, Robert J.; Murray, Gary P.; and Shirley, Roger D., to Kent-Moore Corporation. Storage tank scale for a refrigerant recovery system. 4,878,356, Cl. 62-149.000.

Pupulidy, Emanuel M.: *See*—
Tunningley, William A.; Tunnungley, Martha A.; and Pupulidy, Emanuel M., 4,878,260, Cl. 7-129.000.

Purdes, Andrew J., to Texas Instruments Incorporated. Chemical beam epitaxy system. 4,878,989, Cl. 156-613.000.

Puschel, Petr; Formanek, Zdenek; Krivanek, Vaclav; Pokorny, Antonin; Vlasakova, Anna; and Stuchikova, Alena, to Tessek sdruzeni Praha. Method and device for mineralization of carbonaceous material. 4,879,246, Cl. 436-145.000.

Putt, James C.; and Hohenshil, Robert N., to B. F. Goodrich Company, The. Pneumatic impulse valve and separation system. 4,878,647, Cl. 251-30.050.

Q-Bit Corporation: *See*—
Larkin, Stephen J., 4,879,525, Cl. 330-294.000.

Quadion Corporation: *See*—
Boyd, Richard M., 4,878,766, Cl. 384-130.000.

Quadrex HPS Inc.: *See*—
Grant, David C. H., 4,878,931, Cl. 62-17.000.

Quaggiotti, Vittorio, to S.B.P. S.r.l. Double-shoe ski with intermediate linking member. 4,878,686, Cl. 280-602.000.

Quan, Peter M.; Stewart, David; and Nelson, Anthony J., to Imperial Chemical Industries, PLC. Extraction of metal values. 4,879,388, Cl. 548-262.000.

Quantex Corporation: *See*—
Lindmayer, Joseph, 4,879,186, Cl. 428-691.000.

Questech Limited: *See*—
Barton, Nicholas; Billing, Robert; and Burgess, Paul K., 4,879,597, Cl. 358-88.000.

Quigley, John H.; and Feller, Roger K., to Ford Motor Company. Engine control system with adaptive air charge control. 4,879,656, Cl. 364-431.050.

Quinn, Daniel M., to American Wholesale Packaging, Inc. Method of packaging a desk. 4,878,334, Cl. 53-399.000.

Quinn, John D.: *See*—
Collins, Robert T.; Quinn, John D.; and Fidrych, Stephen A., 4,879,635, Cl. 361-391.000.

R. J. Brunfeldt Company, Inc.: *See*—
Brunfeldt, Robert J.; and Jackson, James C., 4,879,458, Cl. 250-288.000.

Rabe, Duane C.: *See*—
de Muro, David M.; Stillmank, John G.; and Rabe, Duane C., 4,879,533, Cl. 333-206.000.

Radford, Steven R.: *See*—
Ostertag, Alfred; Iversen, Robert E.; Hyland, Craig R.; Enever, Kenneth D.; and Radford, Steven R., 4,878,548, Cl. 175-340.000.

Radwanski, Fred R.; Trimble, Lloyd E.; Smith, Roland C.; and Connor, Linda A., to Kimberly-Clark Corporation. Nonwoven fibrous hydraulically entangled elastic coform material and method of formation thereof. 4,879,170, Cl. 428-233.000.

Rai, Iqbal S.: *See*—
Kindel, Leslie M.; and Rai, Iqbal S., 4,878,716, Cl. 305-21.000.

Ralphco Inc.: *See*—
Dworman, Ralph M.; and Dworman, Nancy S., 4,878,867, Cl. 446-8.000.

Ram Golf Corporation: *See*—
Lukasiewicz, Robert F., 4,878,672, Cl. 273-186.00A.

Ramesh, Nallepilli S.; Cheemalavagu, Suresh; and Erikson, Anders, to Advanced Micro Devices Inc. Adaptive threshold sampling controller. 4,879,727, Cl. 375-76.000.

Ramoos, Ramiro V.: *See*—
Johnson, Marion; Hahn, Granville J.; and Ramoos, Ramiro V., 4,879,138, Cl. 428-218.000.

Randall, Brian G., to Georgia-Pacific Corporation. Glass mat with reinforcing binder. 4,879,173, Cl. 428-285.000.

Rang KG Haus Moderner Fussboden: *See*—
Rang, Klaus, 4,879,143, Cl. 427-387.000.

Rang, Klaus, to Rang KG Haus Moderner Fussboden. Process for the production of floor covering. 4,879,143, Cl. 427-387.000.

Ransburg Corporation: *See*—
Jamison, Chris M.; and Petersen, Eric A., 4,878,622, Cl. 239-690.100.

Ransomes, Sims & Jefferies PLC: *See*—
Aldred, Edward J.; and Lloyd, David J., 4,878,338, Cl. 56-7.000.

Rantala, Mauri: *See*—
Snellman, Yrjo ; and Rantala, Mauri, 4,879,002, Cl. 162-273.000.

Rao, Kalipatnam V.: *See*—
Mitchell, Allan T.; Tigelaar, Howard L.; Garg, Shaym G.; and Rao, Kalipatnam V., 4,878,996, Cl. 156-653.000.

Rapistan Corp.: *See*—
Brouwer, Gerald A., 4,878,578, Cl. 198-809.000.

Rapp, D. J.: *See*—
Rolle, Thomas E.; and Rapp, D. J., 4,878,944, Cl. 75-25.000.

Rapp, Willard E.: *See*—
Muhlberger, Michael A.; and Rapp, Willard E., 4,878,295, Cl. 29-863.000.

Raso, Frank A.: *See*—
Hoelscher, James R.; Frielinghaus, Klaus H.; Raso, Frank A.; and Smith, Barry L., 4,878,638, Cl. 246-34.0CT.

Ratto, Joseph J.: *See*—
Marshall, David B.; De Wames, Roger E.; Morgan, Peter E. D.; and Ratto, Joseph J., 4,879,537, Cl. 335-216.000.

Raudat, John L.; and Johnson, Lloyd D., to Standard-Knapp, Inc. Continuous motion tray type packaging machine. 4,878,337, Cl. 53-534.000.

Raudsepp, Rein; and Beattie, Morris J. Hydrometallurgical process for treating refractory ores containing precious metals. 4,878,945, Cl. 75-118.00R.

Rausing, Hans. Pack for flowable material. 4,878,593, Cl. 220-67.000.

Raychem Corporation: *See*—
Jansons, Viktors; and Gors, Heinrich C., 4,879,366, Cl. 528-125.000.
Mercer, Frank W.; Froix, Michael F.; and Cheng, Tai C., 4,879,338, Cl. 524-508.000.

Raychem Limited: *See*—
Neaves, Bryan D.; Hill, Frederick W. L.; and Cross, Malcolm G., 4,879,148, Cl. 428-40.000.

Raymond, Bernard, to Valeo Systemes D'Essuyage. Connector device to mount a windshield wiper contact clip, and clip endowed with such a connector device. 4,878,263, Cl. 15-250.320.

Raymond, Geri L.; and Raymond, Mark A. Method for printing a double-sided display on transparent film. 4,879,161, Cl. 428-195.000.

Raymond, Mark A.: *See*—
Raymond, Geri L.; and Raymond, Mark A., 4,879,161, Cl. 428-195.000.

Raymond, William M. Apparatus and process for pumping fluid from subterranean formations. 4,878,540, Cl. 166-369.000.

Reddy, Srinivasa N.: *See*—
Herron, Lester W.; Lussow, Robert O.; Nufer, Robert W.; Schwartz, Bernard; Acocella, John; and Reddy, Srinivasa N., 4,879,156, Cl. 428-137.000.

Redemacher, Darrell G., to XCP, Inc. Magnetic card reader device. 4,879,607, Cl. 360-2.000.

Reed, Alastair: *See*—
Stansfield, Peter W.; and Reed, Alastair, 4,879,594, Cl. 358-80.000.

Reed, Gordon K., to Process Automation Business, Inc. Slice lip protector system. 4,879,003, Cl. 162-344.000.

Reed, Jeffrey B.: *See*—
DeLuca, Michael J.; and Reed, Jeffrey B., 4,879,758, Cl. 455-296.000.

Reed Tool Company Limited: *See*—
Barr, John D., 4,878,403, Cl. 76-107.00R.

Reese Enterprises, Inc.: *See*—
Ellingson, Chester W., Jr., 4,879,151, Cl. 428-53.000.

Regan, James B.; Ikovich, George J.; Carlsen, James A.; Juelich, Richard J.; and Kogel, Henry G., to Amca International Corporation. Quick-release mooring apparatus for floating vessels. 4,878,452, Cl. 114-293.000.

Rehmer, Gerd; Niessner, Manfred; Heide, Wilfried; Hartmann, Heinrich; and Peters, Karl-Clemens, to BASF Aktiengesellschaft. Preparation of bead polymers from water-soluble, ethylenically unsaturated monomers. 4,879,361, Cl. 526-201.000.

Reichenberger, Helmut: *See*—
Naser, Georg; Reichenberger, Helmut; and Schlee, Karl-Heinz, 4,878,488, Cl. 128-24.00A.

Reina, David: *See*—
Auer, Robert T.; and Reina, David, 4,878,877, Cl. 446-463.000.

Reinecke, Paul: *See*—
Jager, Gerhard; Jautelat, Manfred; Kramer, Wolfgang; Buchel, Karl H.; Reinecke, Paul; Brandes, Wilhelm; Hanssler, Gerd; and Lurssen, Klaus, 4,878,939, Cl. 71-92.000.

Reiners, Jurgen; Podszun, Wolfgang; Winkel, Jens; Suling, Carlhans; and Klein, Gerhard, to Bayer Aktiengesellschaft. (Methyl)acrylic acid derivatives containing urethane groups. 4,879,402, Cl. 560-26.000.

Reinhall, Rolf B., to Sunds Defibrator Aktiebolag. Method and apparatus for manufacturing fibre pulp. 4,878,997, Cl. 162-23.000.

Reising, John C.: *See*—
Woo, James T. K.; Reising, John C.; Marcinko, Richard M.; and Miles, David E., 4,879,344, Cl. 525-100.000.

Remijn, Mattheus G.: *See*—
Weidenhaupt, Wolfgang; Wepner, Gunther; Dismon, Peter; and Remijn, Mattheus G., 4,878,343, Cl. 57-222.000.

Renishaw plc: *See*—
Stephens, William F. N., 4,879,462, Cl. 250-237.00G.

Research Institute for Production Developement: *See*—
Umio, Suminori; Kozasa, Shizuo; and Yabuuchi, Takahiro, 4,879,301, Cl. 514-321.000.

RESMA S.R.l.: *See*—
Polesel, Giampaolo, 4,878,313, Cl. 47-87.000.

Resnick, Martin H. Electromagnetic pickup for a stringed musical instrument having ferromagnetic strings and method. 4,878,412, Cl. 84-726.000.

Restle, Serge: *See*—
Land, Gerard; Maignan, Jean; Restle, Serge; and Malle, Gerard, 4,879,284, Cl. 514-62.000.

Reynolds, James M., to Zulauf, Inc. Orthodontic appliance. 4,878,840, Cl. 433-9.000.

Reynolds, Scott K.; Vook, Dietrich W.; and Gibbons, James F., to Leland Stanford Junion University, The Board of Trustees of the. Rapid thermal annealing of gallium arsenide with trimethyl arsenic overpressure. 4,879,259, Cl. 437-247.000.

Rhein-Knudsen, Erik: *See*—
Wraight, Peter D.; Marienbach, Edouard; Hache, Jean-Michel; Rhein-Knudsen, Erik; and Evans, Mike, 4,879,463, Cl. 250-270.000.

Rheinhold & Mahla GmbH: *See*—
Rissel, Heinz, 4,878,324, Cl. 52-125.200.

Rheinisch-Westfalische Kalwerke AG: *See*—
Plank, Friedrich W.; Machnig, Helmut; Mischke, Georg H.; Friedrichs, Reinhard; and Nahrmann, Norbert, 4,878,623, Cl. 241-5.000.

Rhenter, Jean-Luc; and Collomb, Jean, to Rhenter, Jean-Luc; Collomb, Jean; and Bejui, Jacques. Prosthetic cupule. 4,878,916, Cl. 623-18.000.

Rhone-Poulenc Chimie: *See*—
Amiet, Louis, 4,879,407, Cl. 560-227.000.
Vinot, Bernard; and Constant, Odile, 4,878,711, Cl. 299-9.000.

Rich, Arthur R., to Pilgrim's Pride Corporation. Slurry plow. 4,879,033, Cl. 210-396.000.

Richards, Edward P.: *See*—
Clark, Alan C.; Richards, Edward P.; and Shaw, Douglas R., 4,879,022, Cl. 209-166.000.

Richardson, Dale W.: *See*—
Phillips, James L.; Richardson, Dale W.; and Hill, J. Donald, 4,878,494, Cl. 128-334.00R.

Richardson, Delmar J. Spray boom height adjustment. 4,878,616, Cl. 239-167.000.

Richeson, William E., Jr.; and Erickson, Frederick L., to Magnavox Government and Industrial Electronics Company. Pneumatic bistable electronic valve actuator. 4,878,464, Cl. 123-90.110.

Richter Gedeon Vegyeszeti Gyar Rt: *See*—
Fischer, Janos; Dobay, Laszlo ; Major, Mihaly; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Hajos, Gyorgy; and Szporny, Laszlo , 4,879,404, Cl. 560-051.000.

Richtmeyer, Robert D.: *See*—
Fredericksen, Arnold E.; and Richtmeyer, Robert D., 4,878,463, Cl. 123-90.410.

Ricoh Company, Limited: *See*—
Ikesue, Masumi; and Ikeda, Takashi, 4,878,603, Cl. 222-167.000.
Kaneda, Tokuzo, 4,879,580, Cl. 355-295.000.

Rieder, Heinz; and Schwaiger, Max, to RSF - Elektronik Gesellschaft m.b.H. Digital measurement of relative displacement using stored correction address data. 4,879,671, Cl. 364-562.000.

Riedle, Klaus: *See*—
Tratz, Herbert; Riedle, Klaus; and Loesel, Georg, 4,878,440, Cl. 110-233.000.

Rieger, Michael L.: *See*—
Warkentin, Paul A.; Rieger, Michael L.; Michalski, Chris A.; and Jolley, Matthew J., 4,879,605, Cl. 358-296.000.

Riegler, Andreas: *See*—
Stritzl, Karl; Luschnig, Franz; Riegler, Andreas; Wurthner, Hubert; and Freisinger, Henry, 4,878,687, Cl. 280-605.000.

Riesenberg, Volker: *See*—
Haller, Bernd; Herkner, Ernst; Murray, Peter; Riesenberg, Volker; Schnatwinkel, Michael; Schulze, Rainer; Wagner, Georg; and Wilmes, Manfred, 4,878,859, Cl. 439-716.000.

Rieter Machine Works Ltd.: *See*—
Binder, Rolf; Staeheli, Paul; Staehli, Urs; and Knabenhans, Fritz, 4,878,784, Cl. 406-70.000.

Righi, Nardino, to Siano, Dante; and Righi, Nardino. Electronic parking time indicator for autovehicles. 4,879,553, Cl. 340-932.200.

Rigidyne Corporation: *See*—
Sampietro, Joseph M.; and Mohajerani, Khosrow, 4,879,617, Cl. 360-106.000.

Riley, Dennis P.: *See*—
Getman, Daniel P.; Periana, Roy A.; and Riley, Dennis P., 4,879,398, Cl. 556-413.000.

Rinkagaku Kogyo Co., Ltd.: *See*—
Sakon, Ichiro; Sekiguchi, Masao; and Kanayama, Atsushi, 4,879,067, Cl. 252-609.000.

Rissel, Heinz, to Rheinhold & Mahla GmbH. Building blocks for building shielding walls against radioactive radiation. 4,878,324, Cl. 52-125.200.

Ritson, Carl: *See*—
Edelman, Howard; and Ritson, Carl, 4,878,646, Cl. 251-9.000.

Rittal-Werk: *See*—
Debus, Jurgen; and Lehr, Lothar, 4,878,777, Cl. 403-205.000.

Ritter, Siegfried, to Gustav Wagner Maschinenfabrik GmbH & Co. KG. Apparatus for sorting workpieces. 4,878,574, Cl. 198-369.000.

Rivas, Grace A.: *See*—
Dugan, William P.; Samudrala, Rama P.; and Rivas, Grace A., 4,878,990, Cl. 156-630.000.

Rivas, Mario A.: *See*—
Burch, Kenneth R.; and Rivas, Mario A., 4,879,733, Cl. 377-44.000.

Rivas, Nadine: *See*—
Poisson, Pierre; Rivas, Nadine; and Deloy, Pierre, 4,879,327, Cl. 524-93.000.

Rizk, Farid: *See*—
Schafer, Roland; and Rizk, Farid, 4,878,758, Cl. 366-101.000.

Roach, James F.; and Roach, Kevin V. Resisting entry of an object into a space between the hinged edge of a door member hingedly attached to a associated jamb member and a surface of the jamb member. 4,878,267, Cl. 16-250.000.

Roach, Kevin V.: *See*—
Roach, James F.; and Roach, Kevin V., 4,878,267, Cl. 16-250.000.

Robert Bosch GmbH: *See*—
Berding, Josef; Bertling, Hannes; Lees, Thomas; and Pabst, Carsten, 4,878,519, Cl. 138-31.000.

Burkel, Rainer; Engelsdorf, Kurt; Gawlik, Rolf; and Hagele, Karl-Heinz, 4,878,470, Cl. 123-401.000.
Eschelbach, Harald; and Klemmer, Wolfram, 4,879,593, Cl. 358-51.000.
Heinrich, Laurent, 4,878,398, Cl. 74-959.000.
Moser, Winfried; and Klinke, Christian, 4,878,381, Cl. 73-118.100.
Rubig, Heinz; and Carolus, Thomas, 4,878,420, Cl. 98-2.080.
Schweizer, Hartmut, 4,879,476, Cl. 307-10.100.

Robeson, Lloyd M.: *See—*
Harris, James E.; Matzner, Markus; and Robeson, Lloyd M., 4,879,354, Cl. 525-425.000.

Robinson, Martin G.: *See—*
Hall, James B.; Robinson, Martin G.; and Swift, Ronald C., 4,878,988, Cl. 156-600.000.

Robinson, Steven P.: *See—*
Julien, Gerald J.; and Robinson, Steven P., 4,878,565, Cl. 188-378.000.

Robson, Michael J., to Imperial Chemical Industries PLC. 2-chloro-3,6-difluoro-benzyl halide. 4,879,423, Cl. 570-127.000.

Robusto, Paul F.: *See—*
Braski, Michael T.; Wissman, Charles H.; Tilton, Richard A.; and Robusto, Paul F., 4,879,721, Cl. 372-18.000.

Roche, Patrick, to La Souterraine S.A. General purpose keyboard for central processing unit with microprocessor and use of this keyboard with a microcomputer. 4,879,557, Cl. 341-23.000.

Rockefeller University, The: *See—*
Merrifield, Robert B., 4,879,273, Cl. 514-12.000.

Rockwell International Corporation: *See—*
Custode, Frank Z., 4,879,583, Cl. 357-42.000.
Grado, Gilbert R., 4,879,694, Cl. 367-3.000.
Marshall, David B.; De Wames, Roger E.; Morgan, Peter E. D.; and Ratto, Joseph J., 4,879,537, Cl. 335-216.000.

Rodrigue, Kenneth: *See—*
Giardina, Jacob; and Rodrigue, Kenneth, 4,878,341, Cl. 56-364.000.

Roemer, Peter B.; and Edelstein, William A., to General Electric Company. Double-sided RF shield for RF coil contained within gradient coils of NMR imaging device. 4,879,515, Cl. 324-318.000.

Rogers, Steven L.: *See—*
Shumate, William A.; Kindred, Daniel R.; Antonio, Franklin P.; Gardner, Steven H.; Kelkar, Krishnanand; Bilotta, Thomas R.; and Rogers, Steven L., 4,879,720, Cl. 371-43.000.

Rogge, Gary L.: *See—*
Busboom, Garry W.; and Rogge, Gary L., 4,878,681, Cl. 280-32.700.

Roggen, Rolf, to Swiss Aluminium Ltd. Device for measuring hydrogen concentration in an aluminum melt. 4,878,375, Cl. 73-19.000.

Rohner, Peter; and Ziemek, Gerhard, to kabelmetal electro Gesellschaft mit beschrankter Haftung. Optical communication cable with ribbon waveguide support. 4,878,732, Cl. 350-96.230.

Rolle, Thomas E.; and Rapp, D. J., to TDJ Group, Inc., The. Method of treating metallic oxide impregnated dust. 4,878,944, Cl. 75-25.000.

Rolli, Karl: *See—*
Heyland, Sven; Rolli, Karl; Roschli, David; and Sihver, Jaak J., 4,879,130, Cl. 426-533.000.

Romano, Antonio, to Campagnolo S.p.A. Device for operating the gear change of a bicycle. 4,878,395, Cl. 74-531.000.

Romano, Antonio, to Campagnolo S.p.A. Rear derailleur for bicycle gears. 4,878,884, Cl. 474-82.000.

Rombi, Max A. Insecticidal collar and process for producing it. 4,879,117, Cl. 424-411.000.

Romero Lledo, Antonio; Diaz Zorita, Fernando; and Cristos, Juan, to Investronica, S.A. Peg for overhead trouser conveyor. 4,878,577, Cl. 198-803.900.

Rondel, Stephen A.; and Dobson, James B., to Advanced Products & Technologies. Portable door lock. 4,878,701, Cl. 292-288.000.

Roschli, David: *See—*
Heyland, Sven; Rolli, Karl; Roschli, David; and Sihver, Jaak J., 4,879,130, Cl. 426-533.000.

Rose, Clyde E., to Browning Corporation. Adjustable shotgun rib. 4,878,308, Cl. 42-102.000.

Rosen, Harold A., to Hughes Aircraft Company. Satellite communications system employing frequency reuse. 4,879,711, Cl. 370-50.000.

Rosen, Sanford: *See—*
Sibalis, Dan; and Rosen, Sanford, 4,878,892, Cl. 604-20.000.

Rosenblad, Axel E., to Rosenblad Corporation. Selective condensation apparatus. 4,878,535, Cl. 165-114.000.

Rosenblad Corporation: *See—*
Rosenblad, Axel E., 4,878,535, Cl. 165-114.000.

Rosendall, Henry J., to Bissell, Inc. Sweeper with pivotally mounted dust bin. 4,878,261, Cl. 15-41.00R.

Rosenthal, Bruce C.; Zill, Kevin L.; Claerbaut, Kevin R.; Berglund, David M.; and Grover, Kenneth L., to Kohler General Corp. Woodworking machine having a plurality of sequentially operative multiple tool units. 4,878,524, Cl. 144-356.000.

Rossi, Barbara A.; and Mitra, Udayanath, to North American Philips Corporation. Method of etching thin indium tin oxide films. 4,878,993, Cl. 156-643.000.

Rossi, Domenico; and Cuomo, Andrea, to SGS-Thomson Microelectronics S.R.L. Analog multiplex for sensing the magnitude and sense of the current through a h-bridge stage utilizing a single sensing resistance. 4,879,641, Cl. 363-98.000.

Rossman, Axel: *See—*
Huether, Werner; Rossman, Axel; and Sikorski, Siegfried, 4,878,821, Cl. 415-9.000.

Roth, Bradley C.: *See—*
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Rothe, Wolfgang: *See—*
Seyffart, Gunther; Rothe, Wolfgang; Bartz, Volker; and Bartz, Volker, 4,879,280, Cl. 514-53.000.

Rothenberger, John D., Jr.: *See—*
Fox, Charles; DeWitt, John W.; and Rothenberger, John D., Jr., 4,879,116, Cl. 424-682.000.

Roussel Uclaf: *See—*
Brion, Francis; Buendia, Jean; and Marie, Christian, 4,879,392, Cl. 548-492.000.
Delevallee, Francoise; and Potier, Pierre, 4,879,298, Cl. 514-282.000.

Roussel Vclaf: *See—*
Tessier, Jean; Demoute, Jean-Pierre; and Cadiergue, Joseph, 4,879,302, Cl. 514-351.000.

Rowan, Hugh H.: *See—*
Cordova, David S.; Rowan, Hugh H.; and Young, John A., 4,879,179, Cl. 428-361.000.

Rowenta-Werke GmbH: *See—*
Birkert, Karl; and Marburger, Heinz, 4,878,423, Cl. 99-332.000.

Roy, Michael G.; Ullrich, Helmut J.; Beattle, John M.; and Sinden, Jimmie D., to Toro Company, The. Turf grooming reel. 4,878,340, Cl. 56-249.000.

Royal North Shore Hospital and Area Health Service: *See—*
O'Neill, Christopher, 4,879,285, Cl. 514-75.000.

RSF - Elektronik Gesellschaft m.b.H.: *See—*
Rieder, Heinz; and Schwaiger, Max, 4,879,671, Cl. 364-562.000.

Rubert, Timothy M.: *See—*
Burke, Edmund T.; Dawdy, Daniel H.; and Rubert, Timothy M., 4,879,743, Cl. 379-142.000.

Rubig, Heinz; and Carolus, Thomas, to Robert Bosch GmbH. Arrangement for climate control in passenger spaces of power vehicles. 4,878,420, Cl. 98-2.080.

Ruderman, Stephen: *See—*
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Rudolph, Lyle J.: *See—*
Doyle, James P.; and Rudolph, Lyle J., 4,878,605, Cl. 224-42.410.

Rudslahti, Eric I.; Hayman, Edward G.; and Pierschbacher, Michael D., to La Jolla Cancer Research Foundation. Use of peptides in control of cell attachment and detachment. 4,879,237, Cl. 435-240.200.

Ruge, Joachim; Kathke, Gregor; and Schlosser, Helmut, to W. Schlafhorst & Co. Device and method for maintaining a voltage level in a control circuit. 4,879,475, Cl. 307-68.000.

Ruggierio, Paul A.; and Anderson, Cynthia E., to Analog Devices, Inc. IC chips with self-aligned thin film resistors. 4,878,770, Cl. 388-308.000.

Ruschhaupt, Dolph W., Jr., to California Fresno Transportation, Inc. Method and apparatus for dispensing a substance to a work area. 4,878,598, Cl. 222-1.000.

Ruse, Alois, to Hartmann & Braun AG. Measuring the concentration of two components in a gas blend. 4,879,245, Cl. 436-124.000.

Rushton, William, to IMI Yorkshire Fittings Limited. Cu—Sn—Zn—Bi alloys. 4,879,094, Cl. 420-476.000.

Russell, Ernest J.; and FitzGerald, Tanya E., to Burlington Industries, Inc. Process for the continuous dyeing of industrial nylon. 4,878,920, Cl. 8-476.000.

Russo, Alberto, to Nu-Graphics Engineering, Inc. Magnetic rotary locking mechanism and method. 4,878,429, Cl. 101-486.000.

Rutkowski, Krzysztof: *See—*
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Rutledge, David L.: *See—*
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Rutledge Engineering (Aust.) Pty. Ltd.: *See—*
Rutledge, Michael J. W., 4,878,847, Cl. 439-74.000.

Rutledge, Michael J. W., to Rutledge Engineering (Aust.) Pty. Ltd. Patchfield system. 4,878,847, Cl. 439-74.000.

Rutzen, Ronald L.: *See—*
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Ryham, Rolf, to Ahlstromforetagen Svenska AB. Apparatus and process for generating steam from wet fuel. 4,878,441, Cl. 110-238.000.

Ryko Manufacturing Company: *See—*
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Ryman, Lennart: *See—*
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Ryobi Motor Products Corp.: *See—*
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Wolfe, Jack, 4,878,405, Cl. 81-57.310.

Ryoden Kasei Co., Ltd.: *See—*
Ohashi, Masato; and Kodai, Shiyojiro, 4,879,153, Cl. 428-76.000.

Ryser, Andreas: *See—*
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Weber, Markus; Ryser, Andreas; and Jeker, Rene , 4,878,352, Cl. 62-51.100.

S.B.P. S.r.l.: *See—*
Quaggiotti, Vittorio, 4,878,686, Cl. 280-602.000.

S. C. Johnson & Son, Inc.: *See—*
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Sacher, Christoph, to Carl Hurth Maschinen - und Zahnradfabrik GmbH & Co. Shiftable friction clutch for gear drives. 4,878,571, Cl. 192-48.910.

Sachse, Hans-Ernst. Condom catheter, a urethral catheter for the prevention of ascending infections. 4,878,901, Cl. 604-174.000.

Sadaki, Hiroshi; Narita Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, to Toyoma Chemical Company, Ltd. 7-(substituted or unsubstituted amino) 3-substituted methyl-^{3}cephem-4-carboxylic acid. 4,879,381, Cl. 540-222.000.

Saeki, Naomi: *See—*
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Saghy, Katalin: *See—*
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Sagstetter, William E.: *See—*
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Saikawa, Isamu: *See—*
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Saint-Cyr, Frederic, to Semetex Corporation. Hermetic leadless semiconductor device package. 4,879,589, Cl. 357-79.000.

Saint-Gobain Vitrage: *See—*
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Saito, Hiromitsu; Uosaki, Yoichi; Sato, Akira; Hirata, Tadashi; Morimoto, Makoto; and Ashizawa, Tadashi, to Kyowa Hakko Kogyo Co., Ltd. Anti-tumor DC-52 compounds. 4,879,386, Cl. 544-343.000.

Saito, Mitsuaki: *See—*
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Saito, Nobuo; and Noda, Mitsuo, to Dainichiseika Color & Chemicals Mfg. Co. Ltd. Halogen-free flame resisting synthetic resin composition. 4,879,332, Cl. 524-436.000.

Saito, Shinji: *See—*
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Saito, Syozo: *See—*
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Sakai, Isao: *See—*
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Sakai, Kazuhiko: *See—*
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Sakai, Kiyomi: *See—*
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Sakai, Nobuhiko; Uchida, Yukio; Wada, Eizo; and Hirose, Yusuke, to Nisshin Steel Company, Ltd. Process for preparing alloyed-zinc-plated titanium-killed steel sheet having excellent deep-drawability. 4,878,960, Cl. 148-127.000.

Sakakibara, Kenji: *See—*
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Sakakibara, Shiro; Miyaishi, Yoshinori; and Kano, Yoshiaki, to Aisin-Aw Kabushiki Kaisha. Endless transmission belt. 4,878,887, Cl. 474-245.000.

Sakamoto, Hirotaka: *See—*
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Sakamoto, Masahiko: *See—*
Zumoto, Nobuyuki; Sakamoto, Masahiko; and Hoshinouchi, Susumu, 4,879,473, Cl. 250-492.200.

Sakamoto, Yumi, to Seiko Epson Corporation. Audio output device. 4,879,699, Cl. 368-63.000.

Sakata, Yoshitsugu; Hashidume, Kazunari; Iwata, Tsutomu; Mukai, Toyoharu; and Kida, Masaaki, to Wako Pure Chemical Industries, Ltd. Urea derivatives. 4,879,383, Cl. 544-37.000.

Sakauchi, Takashi: *See—*
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Sakoda, Ryozo: *See—*
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Sakon, Ichiro; Sekiguchi, Masao; and Kanayama, Atsushi, to Rinkagaku Kogyo Co., Ltd. Red phosphorus flame retardant and nonflammable resinous composition containing the same. 4,879,067, Cl. 252-609.000.

Salembier, Philippe; and Lamnabhi, Moustanir, to U.S. Philips Corporation. Apparatus for the decoding coded frequency modulated signals. 4,879,729, Cl. 375-104.000.

Saliba, Michael J., Jr. Medical application for heparin and related molecules. 4,879,282, Cl. 514-56.000.

Saltzman, Gilbert A.; Wertz, Timothy A.; and Friedman, Ira L., to Metallurgical Industries, Inc. Method of refurbishing cast gas turbine engine components and refurbished component. 4,878,953, Cl. 148-4.000.

Samal, Prasan K.; and Nadkarni, Anil V., to SCM Metal Products, Inc. Equiaxed dispersion strengthened copper product and process for making same. 4,879,091, Cl. 419-19.000.

Sampietro, Joseph M.; and Mohajerani, Khosrow, to Rigidyne Corporation. Actuator assembly for hard disk drives. 4,879,617, Cl. 360-106.000.

Samson, Ilan. Extendable table. 4,878,439, Cl. 108-83.000.

Samudrala, Rama P.: *See—*
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Sanchem, Inc.: *See—*
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Sanden Corporation: *See—*
Kikuchi, Sei; Terauchi, Kiyoshi; Takai, Kazuhiko; and Higuchi, Teruo, 4,878,817, Cl. 417-222.00S.
Ushikubo, Kohei, 4,879,540, Cl. 235-385.000.

Sanders Associates, Inc.: *See—*
Lawrence, James, 4,879,567, Cl. 346-139.00R.

Sanders, David C.; Sands, John L.; and Stahl, Joseph L., to Great Lakes Chemical Corporation. Bromination of polystyrene using bromine as the reaction solvent. 4,879,353, Cl. 525-357.000.

Sanders, John T., to A. W. Schlottmann. Binary fluid system, and components thereof, for producing an impregnated metered fluid stream. 4,879,027, Cl. 210-123.000.

Sanders, Robert N.: *See—*
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Sandoz Ltd.: *See—*
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Sands, John L.: *See—*
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Sands, Keith P.: *See—*
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Sangamo Weston, Inc.: *See—*
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Sanner, Martin W., to Tandem Computers Incorporated. Scan data path coupling. 4,879,718, Cl. 371-22.300.

Sano, Akira; Kobayashi, Seizo; Matsuura, Kazuo; Yokoyama, Shigeki; and Kamiya, Takeshi, to Nippon Oil Co., Ltd. Process for the production of polyethylene materials. 4,879,076, Cl. 264-28.000.

Sano, Hiroshi: *See—*
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Sano, Masaki, to Kabushiki Kaisha Toshiba. Apparatus for generating index signals, for use in magnetic recording/reproducing apparatuses. 4,879,608, Cl. 360-51.000.

Sano, Yasuro; Koide, Akio; Hyodo, Toru; Kobayashi, Fumihiko; Kawasato, Takayuki; and Osanai, Yasuhiko. Electronic sewing machine and presser foot particularly for buttonhole stitches and process for producing buttonhole stitches utilizing alternately operable sensor. 4,878,444, Cl. 112-264.100.

Santandrea, Luciano; and Lombardi, Massimo, to Axis S.p.A. Armature paper feeding, cutting, and inserting device. 4,878,292, Cl. 29-734.000.

Sanyo Electric Co., Ltd.: *See—*
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Sekigami, Kunie; Nagae, Kouji; and Sasaki, Yoji, 4,878,357, Cl. 62-160.000.

Sapienza, Samuel J., IV; van Vuuren, Willem N. J.; Shirey, Benjamin G.; and Wakeman, Russell J., to Siemens-Bendix Automotive Electronics L.P. Variable camshaft timing system. 4,878,461, Cl. 123-90.150.

Sapino, Chester, Jr.: *See—*
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Sarges, Reinhard: *See—*
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Sasaki, Kouji: *See—*
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Sasaki, Yoji: *See—*
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Sasayama, Toshio: *See—*
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Sass, Thomas J. Locking and seating means for chimney liners. 4,878,326, Cl. 52-218.000.

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Sato, Hiroaki: *See—*
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Sato, Kiyotaka: *See—*
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Sato, Takashi: *See—*
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Satoh, Motoaki: *See*—
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Satoh, Paul S.: *See*—
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Satt Communications AB: *See*—
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Sauerwald, Wilhelm A.; DeWilde, Johannes; Van Eerdewijk, Karel J. E.; Beenker, Franciscus P. M.; and Segers, Marinus T. M., to U.S. Philips Corp. Testable carriers for integrated circuits. 4,879,717, Cl. 371-22.300.
Saunders, David H.: *See*—
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Sawai Pharmaceutical Co., Ltd.: *See*—
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Sawdon, Edwin G., to BTM Corporation. Hand held sheet metal joining system. 4,878,284, Cl. 29-243.530.
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Schade, Gerold; Paulus, Wilfried; and Schmitt, Hans-Georg, to Bayer Aktiengesellschaft. New cyanohydrin iodopropargyl ethers, process for their preparation and their use as microbicides. 4,879,310, Cl. 514-519.000.
Schadin, Lev V.; and Klimov, Alexander S. Apparatus for building pneumatic tire covers. 4,878,983, Cl. 156-415.000.
Schaedel, Fred C.: *See*—
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Schaeffler, Georg, to INA Walzlager Schaeffler KG. Cage. 4,878,569, Cl. 192-45.000.
Schafer, Roland; and Rizk, Farid, to Harth & Seifert GmbH. Process for mixing bulk materials. 4,878,758, Cl. 366-101.000.
Schaich, Karl-Heinz: *See*—
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Scherm, Peter. Sheet material carrier. 4,878,693, Cl. 281-45.000.
Schiel, Christian: *See*—
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Schilling, Bernd; and Fickert, Karl-Ernst, to Wacker-Chemie GmbH. Novel coating slips. 4,879,336, Cl. 524-503.000.
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Schleimann-Jensen, Lars J.; Engding, Alf E.; and Astrom, Anders F., to U.S. Philips Corporation. Gyroslabilized optical radiation deflection device providing a stabilized radiation sensitivity lobe. 4,879,460, Cl. 250-230.00R.
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Schlosser, Helmut: *See*—
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Schluenz, Robert W., to Arizona Chemical Company. Isomerized terpene tackifier resins. 4,879,351, Cl. 525-332.100.
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Jones, Timothy G. J.; and Hughes, Trevor L., 4,878,382, Cl. 73-153.000.
Wraight, Peter D.; Marienbach, Edouard; Hache, Jean-Michel; Rhein-Knudsen, Erik; and Evans, Mike, 4,879,463, Cl. 250-270.000.
Schmalz, Steven M.: *See*—
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Schmid, Reinhold, to W. Schlafhorst & Co. Guide roller assembly. 4,878,630, Cl. 242-43.00R.
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Coffen, David L.; Schmid, Rudolf; and Sebastian, Mark J., 4,879,395, Cl. 549-408.000.
Schmidt, Anthony, Jr. Boat lifting device. 4,878,450, Cl. 114-259.000.
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Schmidt, Konrad. Single- or multiple-part protective cover for traction drives. 4,878,467, Cl. 123-195.00C.
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Schnatwinkel, Michael: *See*—
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Schobermayer, Harald. Method for producing a rigid shaped body. 4,878,975, Cl. 156-163.000.
Schoeff, Terry G.; and Kaufman, Rex A., to Majco Building Specialites, L.P. Fireplace having chimney construction including cold air barrier. 4,878,481, Cl. 126-307.00R.
Schoemaker, Hubert J. P.: *See*—
Wands, Jack R.; Zurawski, Vincent R., Jr.; and Schoemaker, Hubert J. P., 4,879,219, Cl. 435-7.000.
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Schoenwald, Ronald D., to Angelini Pharmaceuticals Ltd. Opthalmic composition. 4,879,294, Cl. 514-253.000.
Schoenwald, Ronald D., to Angelini Pharmaceuticals Ltd. Ophthalmic compositions and process for preparing. 4,879,304, Cl. 514-374.000.
Scholkens, Bernward: *See*—
Teetz, Volker; Geiger, Rolf; Urbach, Hansjorg; Becker, Reinhard; and Scholkens, Bernward, 4,879,403, Cl. 560-38.000.
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Schram, Cornelius J., to National Research Development Corporation. Process for controlling a reaction by ultrasonic standing wave. 4,879,011, Cl. 204-157.420.
Schreckendgust, Jay G.; Pantelleria, James E.; and Bergeron, Mark M., to X-Ray Industries, Inc. Inspection apparatus and method using X-rays. 4,879,734, Cl. 378-57.000.
Schreiner, Siegfried: *See*—
Hoppe, Klaus-Dieter; Leutner, Bernd; and Schreiner, Siegfried, 4,879,102, Cl. 423-235.000.
Schroder, Joris, to Inventio AG. Group control for elevators with load dependent control of the cars. 4,878,562, Cl. 187-127.000.
Schroder, Wolfgang: *See*—
Henneken, Bernhard; Kammerling, Bruno; Scholz, Eckhard-K.; Schroder, Wolfgang; and Krause, Hans, 4,878,655, Cl. 266-184.000.
Schroeder, Jon M. Electronic circuit chip connection assembly and method. 4,878,846, Cl. 439-65.000.
Schroth, Volkmar; and Levin, Horst, to U.S. Philips Corporation. Phase control loop with interrupted control. 4,879,529, Cl. 331-14.000.
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Schweizer, Hartmut, to Robert Bosch GmbH. Method and apparatus for transmitting signals. 4,879,476, Cl. 307-10.100.
Schwender, Charles F.; and Dodd, John H., to Ortho Pharmaceutical Corporation. Preparation of thiocycloalkno [3,2-b] pyridines. 4,879,384, Cl. 546-114.000.
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Sekigami, Kunie; Nagae, Kouji; and Sasaki, Yoji, to Sanyo Electric Co., Ltd. Air-conditioning apparatus. 4,878,357, Cl. 62-160.000.
Sekiguchi, Kyoji, to Canon Kabushiki Kaisha. Ophthalmic measuring apparatus. 4,878,750, Cl. 351-212.000.
Sekiguchi, Masao: *See*—
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Senkowski, Gottfried; and Sturm, Joachim, to Dynamit Nobel Aktiengesellschaft. Detonator pellet. 4,878,430, Cl. 102-202.900.
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Senuma, Makoto; Kondoh, Shigeru; Kawase, Tadamasa; and Nakagawa, Yoshihiko, to Yamanouchi Pharmaceutical Co., Ltd. Glycyrrhetinic acid-containing plasters. 4,879,118, Cl. 424-448.000.
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Seto, Izumi; Tsuyuki, Mikio; and Takashima, Yutaka, to Fuji Photo Film Co., Ltd. Automatic machine for unloading film sheet from magazine. 4,878,799, Cl. 414-331.000.
Seto, Kiyotomo; Matsumoto, Hiroo; and Sakoda, Ryozo, to Nissan Chemical Industries Ltd. Process for producing alpha-(benzylidene)acetonylphosphonates. 4,879,400, Cl. 558-83.000.
Seto, Toshiki, to Mitsubishi Denki K.K. Infrared video camera shading correction device. 4,879,598, Cl. 358-113.000.
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SGS-Thomson Microelectronics, s.r.l.: *See*—
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Shaw, David N., to Carrier Corporation. Common compression zone access ports for positive displacement compressor. 4,878,818, Cl. 417-308.000.
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Shaw, Laurence J. Swinging bob toy. 4,878,868, Cl. 446-75.000.
Sheldon, Dunstan P. Multiple document parallel printing apparatus. 4,879,268, Cl. 503-201.000.
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Fried, Herbert E.; and Edwards, Charles L., 4,879,394, Cl. 549-255.000.

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Kastelic, John R., 4,879,358, Cl. 525-539.000.
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van Laar, Hermanus G.; Lea, Richard H.; and Payne, Beverley, 4,879,014, Cl. 204-190.000.

Shemwell, David M.; and Cantrell, Cyrus D., to Board of Regents, The University of Texas System. Method and apparatus for phase conjugate optical modulation. 4,879,532, Cl. 330-4.300.

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Shibasaki, Ken-ichiro; Itoi, Hiroshi; Ohkubo, Shouichi; and Sano, Hiroshi, to Lion Corporation. Artificial saliva composition. 4,879,281, Cl. 514-55.000.

Shibata, Tohru: *See*—
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Shibato, Kishio; and Kawamura, Masataka, to Nippon Oil and Fats Co., Ltd. Polyol resin coating composition containing non-aqueous polymer dispersion and aliphatic sulfonic acid compound. 4,879,337, Cl. 524-504.000.

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Shigemura, Yutaka: *See*—
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Shimada, Toshiro: *See*—
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Shimizu, Junichi; and Nakajoh, Tadashi, to Nissei Jushi Kogyo Kabushiki Kaisha. Control method of injection molding machine. 4,879,077, Cl. 264-40.100.

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Shimizu, Michitaka, to Compex Co., Ltd. Method for culturing and cultivating fungi. 4,878,312, Cl. 47-1.100.

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Shimoda, Naoto; and Kawaguchi, Tsutomu, to Chugai Seiyaku Kabushiki Kaisha. Method and composition for preventing the adsorption of a medicine. 4,879,272, Cl. 514-8.000.

Shimoyama, Yuji: *See*—
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Shimshock, Richard P.: *See*—
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Shin Nihon Chemical Industry Co., Ltd.: *See*—
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Shinko Electric Co., Ltd.: *See*—
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Shinohara, Tooru; and Iwatsubo, Masahito, to Fujitsu Limited. DC motor drive system for reducing start-up current. 4,879,498, Cl. 318-254.000.

Shinoto, Yoshinori. Selection system for ideographic characters by touch typing using phonetic/hieroglyphic codes. 4,879,653, Cl. 364-419.000.

Shinto Paint Co., Ltd.: *See*—
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Shioji, Mitsuaki, to Sharp Kabushiki Kaisha. Liquid crystal display device with particular impedance ratio for signal and common electrodes. 4,878,739, Cl. 350-336.000.

Shionogi & Co., Ltd.: *See*—
Sonoyama, Takayasu; Yagi, Shigeo; Kageyama, Bunji; and Tanimoto, Masahiro, 4,879,229, Cl. 435-138.000.

Shionozaki, Yoshio; Mukai, Hiroshi; Obikawa, Tsuyoshi; and Yamada, Shuhei, to Seiko Epson Kabushiki Kaisha. 2-phenylpyridine derivatives and liquid crystal compositions including same. 4,879,060, Cl. 252-299.610.

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Shirafuji, Tamio; and Sakai, Kiyomi, to Sumitomo Chemical Company, Limited. Method for producing cycloalkanol. 4,879,422, Cl. 568-835.000.

Shiraishi, Mikio, to Kabushiki Kaisha Toshiba. Parallel adder circuit with sign bit decoder for multiplier. 4,879,677, Cl. 364-760.000.

Shirasaka, Akitoshi: *See*—
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Shue, Ming-Jeng. Electronic stethoscopic apparatus. 4,878,501, Cl. 128-715.000.

Shumate, William A.; Kindred, Daniel R.; Antonio, Franklin P.; Gardner, Steven H.; Kelkar, Krishnanand; Bilotta, Thomas R.; and Rogers, Steven L., to M/A-Com Government Systems, Inc. Decoder ring system. 4,879,720, Cl. 371-43.000.

Siano, Dante: *See*—
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Sibalis, Dan; and Rosen, Sanford, to Drug Delivery Systems Inc. Electrolytic transdermal delivery of polypeptides. 4,878,892, Cl. 604-20.000.

Sieber, Eugene W.: *See*—
Manniso, James L.; Sieber, Eugene W.; and Voshell, Glenn R., 4,878,930, Cl. 55-493.000.

Siebrecht, Manfred, to Hoechst Aktiengesellschaft. Tubular package casing composed of mutually connected sections. 4,879,123, Cl. 426-105.000.

Siegmund, Hans-Joachim; and Schwiecker, Horst, to Leybold Aktiengesellschaft. Process and device for measuring the optical properties of thin layers. 4,878,755, Cl. 356-382.000.

Siemens Aktiengesellschaft: *See*—
Assel, Eugen; Dasbach, Burkhard; and Gebhard, Bruno, 4,879,434, Cl. 174-35.00R.
Bergman, Ulf; Sommer, Jurgen; and Borggren, Arne, 4,879,736, Cl. 378-181.000.
Fuehrer, Diethelm, 4,879,663, Cl. 364-513.000.
Intichar, Lutz, 4,879,622, Cl. 361-19.000.
Kruehler, Wolfgang; and Milla, Peter, 4,879,251, Cl. 437-4.000.
Naser, Georg; Reichenberger, Helmut; and Schlee, Karl-Heinz, 4,878,488, Cl. 128-24.00A.
Nassler, Peter, 4,879,750, Cl. 381-68.600.
Pausch, Guenther, 4,879,538, Cl. 335-298.000.
Wilhelm, Wilhelm; and Birth, Winfried, 4,879,530, Cl. 331-45.000.

Siemens Aktiengesellschtaft: *See*—
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Siemens Aktiengessellschaft: *See*—
Tratz, Herbert; Riedle, Klaus; and Loesel, Georg, 4,878,440, Cl. 110-233.000.

Siemens-Bendix Automotive Electronics L.P.: *See*—
Sapienza, Samuel J., IV; van Vuuren, Willem N. J.; Shirey, Benjamin G.; and Wakeman, Russell J., 4,878,461, Cl. 123-90.150.

Siemens-Bendix Automotive Electronics Limited: *See*—
DeJong, Allan W., 4,878,514, Cl. 137-110.000.

Siemens Gammasonics, Inc.: *See*—
Persyk, Dennis E.; and Hamill James J., 4,879,465, Cl. 250-363.020.

Siemens Transmission Systems, Inc.: *See*—
Virdee, Nirmal S.; and Baradaran, Hamid R., 4,879,730, Cl. 375-106.000.

Siems, Wolfgang: *See*—
Pinck, Peter; Lorenzen, Heinz-Christen; Heitmann, Uwe; and Siems, Wolfgang, 4,878,506, Cl. 131-84.400.
Siewert, Robert L.: *See*—
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Sigma-Tau Industrie Farmaceutiche Riunite S.p.A.: *See*—
Foresta, Piero; Ghirardi, Orlando; Gabetta, Bruno; and Cristoni, Aldo, 4,879,376, Cl. 536-18.100.
Sihver, Jaak J.: *See*—
Heyland, Sven; Rolli, Karl; Roschli, David; and Sihver, Jaak J., 4,879,130, Cl. 426-533.000.
Sikorski, Siegfried: *See*—
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Silver, Arnold H., to TRW Inc. Vernier for superconducting analog-to-digital converter. 4,879,488, Cl. 341-171.000.
Silversides, David W.; Mapletoft, Reuben J.; Murphy, Bruce D.; and Misra, Virkam, to University of Saskatchewan. Monoclonal antibodies against GnRH. 4,879,112, Cl. 424-85.900.
Simione, Frank P.: *See*—
Daggett, Pierre-Marc; and Simione, Frank P., 4,879,239, Cl. 435-252.100.
Simon, Bernard: *See*—
Delatte, Daniel; and Simon, Bernard, 4,878,594, Cl. 220-254.000.
Simpson, Howard D.; and Borgens, Pauline B., to Union Oil Company of California. Hydroprocessing catalyst and phosphorous and citric acid containing impregnating solution. 4,879,265, Cl. 502-211.000.
Simpson, Steven C.; and Weible, Warren W., to SK Hand Tool Corp. Screwdriver blade. 4,878,406, Cl. 81-436.000.
Sinden, Jimmie D.: *See*—
Roy, Michael G.; Ullrich, Helmut J.; Beattle, John M.; and Sinden, Jimmie D., 4,878,340, Cl. 56-249.000.
Sindorf, John F., to Globe-Union Inc. Crimp terminal for a battery. 4,879,191, Cl. 429-181.000.
Singh, Balwant; Chang, Laurence W.; and Henderson, William A., Jr., to American Cyanamid Company. Preparation of primary aralkyl urethanes and ureas and isocyanates derived therefrom. 4,879,410, Cl. 560-344.000.
Singletary, Larry F., to L&S Technologies, Inc. Gunsight mounting device for a revolver. 4,878,307, Cl. 42-101.000.
Sinn, Robert S.: *See*—
Catsimpoolas, Nicholas; Kamarei, Ahmad R.; Griffith, Ann L.; and Sinn, Robert S., 4,879,114, Cl. 424-95.000.
Sinnett, Kevin B., to Trek Medical Products, Inc. Illuminated tissue manipulator for ophthalmic surgery. 4,878,487, Cl. 128-20.000.
Sinofsky, Edward L.; Spears, J. Richard; Dickinson, Douglas W.; and Wagner, Maria S., to C. R. Bard, Inc. Laser balloon catheter. 4,878,492, Cl. 128-303.100.
Siren, Andy O. All-terrain amphibian vehicle. 4,878,451, Cl. 114-270.000.
SK Hand Tool Corp.: *See*—
Simpson, Steven C.; and Weible, Warren W., 4,878,406, Cl. 81-436.000.
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SKF GmbH: *See*—
Brandenstein, Manfred; and Kober, Jurgen, 4,878,885, Cl. 474-135.000.
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Skinner, David J.: *See*—
Adam, Colin M.; Bye, Richard L.; Das, Santosh K.; and Skinner, David J., 4,878,967, Cl. 148-437.000.
Adam, Colin M.; Bye, Richard L.; Das, Santosh K.; and Skinner, David J., 4,879,095, Cl. 420-548.000.
Slater, William M. Disposable cover arrangement for laryngoscopes and the like. 4,878,486, Cl. 128-110.000.
Slattery, Gordon C.: *See*—
Boda, James C.; and Slattery, Gordon C., 4,878,468, Cl. 123-195.00P.
Slavata, Bohumil, to TESLA, koncernovy podnik. Clamping frame for contact printers of working masks. 4,879,573, Cl. 355-125.000.
Smith, Barry L.: *See*—
Hoelscher, James R.; Frielinghaus, Klaus H.; Raso, Frank A.; and Smith, Barry L., 4,878,638, Cl. 246-34.0CT.
Smith, Clyde K. Vaccine for immunologically mediated nutritional disturbances associated with plant protein antigens. 4,879,113, Cl. 424-88.000.
Smith, Douglas C., to American Telephone and Telegraph Company; and AT&T Information Systems Inc. Noise measurement probe. 4,879,507, Cl. 324-57.00N.
Smith, E. Dallas: *See*—
Cooper, Herbert E.; de Fazekas, Josef P.; and Smith, E. Dallas, 4,878,691, Cl. 280-189.000.
Smith, Gale E.; and Summers, Max D., to Texas A&M University System, The. Method for producing a recombinant baculovirus expression vector. 4,879,236, Cl. 435-235.000.
Smith, James C.: *See*—
Lindsay, Tom E.; and Smith, James C., 4,878,845, Cl. 434-238.000.
Smith, Kennith A.; and Haig, Connie L., to General Electric Company. Method for reducing silicone foam density and silicone foam compositions. 4,879,317, Cl. 521-82.000.
Smith, Leonard B., Sr. Automobile door guard. 4,879,543, Cl. 340-473.000.
Smith, Roland C.: *See*—
Radwanski, Fred R.; Trimble, Lloyd E.; Smith, Roland C.; and Connor, Linda A., 4,879,170, Cl. 428-233.000.
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Smith, Stephan J. Safety device for water skiing. 4,878,449, Cl. 114-253.000.
Smith, W. Novis. Lightweight armor. 4,879,165, Cl. 428-212.000.
Smoker, Kurt A.: *See*—
Stolarczyk, Larry G.; Smoker, Kurt A.; Boese, Gerald J.; Mondt, William E.; Hasenack, Marvin L., Jr.; Zappanti, James L.; Smith, Seth A.; and Moore, Edward D., 4,879,755, Cl. 455-3.000.
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Snelling, Christopher, to Xerox Corporation. Tri-level, highlight color imaging using tonography. 4,879,194, Cl. 430-53.000.
Snellman, Yrjo ; and Rantala, Mauri, to Oy Tampella Ab. Frame construction of the press section in a paper machine. 4,879,002, Cl. 162-273.000.
Snopkowski, Daniel J., to International Fuel Cells Corporation. Fuel cell air pressurization system and method. 4,879,189, Cl. 429-13.000.
Snow, Steven A.: *See*—
Lo, Sunny J.; and Snow, Steven A., 4,879,051, Cl. 252-8.750.
Societe Anonyme dite: CGEE Alsthom: *See*—
Heng, Jean-Paul; Marmonier, Andre ; and Briguet, Etienne, 4,878,855, Cl. 439-411.000.
Societe Francaise de Munitions: *See*—
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Societe Nouvelle Des Etablissements J. Lagarde: *See*—
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Sofranko, John A., to Atlantic Richfield Company. Methane conversion. 4,879,427, Cl. 585-500.000.
Sogandares-Bernal, Franklin: *See*—
Judy, Millard M.; Matthews, James L.; Newman, Joseph T.; and Sogandares-Bernal, Franklin, 4,878,891, Cl. 604-5.000.
Sojka, Richard: *See*—
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Solar Turbines Incorporated: *See*—
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Sometani, Taro; Takaoka, Naotoshi; Aida, Mitsuo; Kudomi, Mitsuharu; Tanahashi, Yasuhiro; and Aoki, Katsunori, to Energy Support Corporation. Zero-phase-sequence voltage sensing apparatus. 4,879,509, Cl. 324-108.000.
Sommer, Jurgen: *See*—
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Sommerfield, John R., to Peco Controls Corporation. Filler line monitoring system with autosynchronization. 4,878,333, Cl. 53-53.000.
Sommet, Pierre, to Societe Francaise de Munitions. Penetrating projectile with hard core and ductile guide and method of making it. 4,878,434, Cl. 102-514.000.
Sonneville, Pierre R.: *See*—
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Sonobe, Takashi: *See*—
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Sonoyama, Takayasu; Yagi, Shigeo; Kageyama, Bunji; and Tanimoto, Masahiro, to Shionogi & Co., Ltd. Method for preparing 2,5-diketo-D-gluconic acid. 4,879,229, Cl. 435-138.000.
Sony Corporation: *See*—
Chamberlin, Davis W.; Leonard, Vurnen J.; and Koizumi, Osamu, 4,879,621, Cl. 360-133.000.
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Newton, Robert K.; and Schmalz, Steven M., 4,878,760, Cl. 366-149.000.

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Weber, Markus; Ryser, Andreas; and Jeker, Rene , 4,878,352, Cl. 62-51.100.
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Spiegel, Nikolaus; Krestyn, Karlheinz; and Blaser, Theobald, to Heidelberger Druckmaschinen AG. Device for measuring paper or the like lying on a support. 4,879,513, Cl. 324-207.000.
Spiess, Wolfram; and Himmelreich, Rolf, to C.F. Spiess & Sohn GmbH & Co. Boron tris-(dialkyl-dithiocarbamates) and a process for their preparation. 4,879,071, Cl. 562-882.000.
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Halasz, Andrew; Spinelli, Giuseppe; and Doolittle, David H., 4,878,950, Cl. 106-273.100.
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Stache, Knut, to DD-Dynamic Devices Ltd. Apparatus for transforming sea water, brackish water, polluted water or the like into a nutrious drink by means of osmosis. 4,879,030, Cl. 210-238.000.
Stachowiak, J. Edward. High pressure reciprocating pump apparatus. 4,878,815, Cl. 417-63.000.
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Stanislawczyk, Vic, to B.F. Goodrich Company, The. Film of carboxylated acrylate latex, and article made therefrom. 4,879,364, Cl. 526-318.200.
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State of Oregon Acting By and Through the State Board of Higher Education On Behalf of the University of Oregon: *See*—
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Stearns, Thornton; and Blanton, Russell W., to Vacuum Barrier Corporation. Chilling assembly line workpieces by cryogen counterflow. 4,878,354, Cl. 62-63.000.
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Stefaniu, Marian; Gran, Paul; Feiner, Haim, deceased; and Feiner, Ilana, heiress, to Motorola, Inc. Supervisory control system. 4,879,541, Cl. 340-825.070.
Steinbach, John, to United Technologies Corporation. Method of reusably sealing a silicone rubber vacuum bag to a mold for composite manufacture. 4,878,979, Cl. 156-285.000.
Steinberger, Ned, to Steinberger Sound Corporation. String tuning and clamping device. 4,878,413, Cl. 84-314.00N.
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Stern, Richard A.; and Babbitt, Richard W., to United States of America, Army. Slotted microstrip antenna with ferrite coating. 4,879,562, Cl. 343-700.0MS.
Sterzel, Hans-Josef, to BASF Aktiengesellschaft. Processes of making plastics mixtures which absorb electromagnetic radiation and contain ferroelectric and/or piezoelectric substances. 4,879,065, Cl. 252-600.000.
Stevens, John K.; and Waterhouse, Paul I. Radio broadcast communication systems. 4,879,756, Cl. 455-39.000.
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Stroman, David W.; Cregg, James M.; Harpold, Michael M.; and Sperl, George T., to Phillips Petroleum Company. Transformation of yeasts of the genus pichia. 4,879,231, Cl. 435-172.300.
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Stuitje, Cornelis C. Apparatus for exhausting the combustion gases of a stove fired on liquid or gaseous fuel. 4,878,479, Cl. 126-84.000.
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Sumitomo Electric Industries, Ltd.: *See*—
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Ochiai, Kiyoshi, 4,878,526, Cl. 152-209.00R.

Summers, Max D.: *See*—
Smith, Gale E.; and Summers, Max D., 4,879,236, Cl. 435-235.000.

Sun-Flex Company, Inc.: *See*—
Gart, Mark, 4,879,451, Cl. 219-121.690.

Sun, Robert L.; and Kenney, James F., to Johnson & Johnson Patient Care, Inc. Surgical pressure sensitive adhesive sheet product. 4,879,178, Cl. 428-355.000.

Sunds Defibrator Aktiebolag: *See*—
Reinhall, Rolf B., 4,878,997, Cl. 162-23.000.

Sundstrand Corporation: *See*—
Ames, John E., 4,878,809, Cl. 416-151.000.
Hagshenas, Behzad, 4,878,805, Cl. 415-169.100.
Huss, John B., 4,879,484, Cl. 310-114.000.
Jones, Gregory D.; Owens, William R.; Thiel, Clifford G.; and Danby, Clive M., 4,879,624, Cl. 361-65.000.
Vicari, John J.; and Suttie, Peter J., 4,879,662, Cl. 364-510.000.

Sundt, Thoralf M. Surgical probe and suction device. 4,878,900, Cl. 604-119.000.

Sunkel, Marianne: *See*—
Banasiak, Lothar; Edlich, Wilfried; Lyr, Horst; Nega, Eva; and Sunkel, Marianne, 4,879,291, Cl. 514-237.800.

Sunny's Waterbeds & Accessories, Inc.: *See*—
Lupo, Anthony C., 4,878,259, Cl. 5-451.000.

Suntiger, Inc.: *See*—
Johansen, Laurie A.; and Diffendaffer, Paul, 4,878,748, Cl. 351-44.000.

Suntory Limited: *See*—
Koga, Kunimasa; Fujikawa, Shigeaki; and Fukui, Yuko, 4,878,921, Cl. 8-646.000.

Super Sack Manufacturing Corporation: *See*—
Derby, Norwin C., 4,878,600, Cl. 222-105.000.

Super Sagless Corporation: *See*—
Tacker, Billy D., 4,878,710, Cl. 297-68.000.

Sutter, Leroy V.; and Cameron, Harold A. Gas/saline valve with suction control. 4,878,894, Cl. 604-24.000.

Suttie, Peter J.: *See*—
Vicari, John J.; and Suttie, Peter J., 4,879,662, Cl. 364-510.000.

Suyama, Toshimitsu; and Fujimori, Yasutomo, to Kabushiki Kaisha Toshiba. Three-dimensional position sensor and three-dimensional position setting system. 4,879,664, Cl. 364-518.000.

Suzukamo, Gohfu; and Fukao, Masami, to Sumitomo Chemical Company, Limited. Solid base, process for preparing the same and use of the same in preparation of internal olefins. 4,879,429, Cl. 585-670.000.

Suzuki, Azuma; Ootani, Takayuki; and Isobe, Mitsuo, to Kabushiki Kaisha Toshiba. Semiconductor memory device with a data clear circuit. 4,879,686, Cl. 365-189.110.

Suzuki, Hidefumi, to CSK Corporation. Optical recording system with optical recording medium having multilevel recording surface for tracking. 4,879,691, Cl. 365-215.000.

Suzuki, Hirokazu; Machida, Yoshio; and Yuasa, Yuji, to Kabushiki Kaisha Toshiba. Magnetic resonance imaging system. 4,878,499, Cl. 128-653.00A.

Suzuki, Hiroshi: *See*—
Moriguchi, Soyao; Suzuki, Hiroshi; Watanabe, Hiroko; Satoh, Motoaki; Abe, Michio; and Iwata, Yasuo, 4,879,340, Cl. 525-54.200.

Suzuki, Katsumi, to Kabushiki Kaisha Toshiba. Information storage medium and a method of manufacturing the same. 4,879,205, Cl. 430-523.000.

Suzuki, Masahiro: *See*—
Yamamoto, Haruhiko; Suzuki, Masahiro; Udagawa, Yoshiaki; Nakata, Mitsuhiko; Katsuyama, Koji; Ono, Izumi; and Kikuchi, Shunichi, 4,879,632, Cl. 361-386.000.

Suzuki, Masao: *See*—
Yamada, Takeshi; Osato, Yasukuni; Watanabe, Okosu; Suzuki, Masao; Kawata, Osamu; and Ishihara, Koushi, 4,878,933, Cl. 65-29.000.

Suzuki, Nobuyoshi: *See*—
Moriya, Yasuo; Suzuki, Nobuyoshi; and Goto, Hiroshi, 4,879,347, Cl. 525-263.000.

Suzuki, Satoshi: *See*—
Kitaguchi, Hiroshi; Izumi, Shigeru; and Suzuki, Satoshi, 4,879,466, Cl. 250-370.140.

Suzuki, Takashi: *See*—
Fukuoka, Tatsuhiko; and Suzuki, Takashi, 4,878,768, Cl. 384-279.000.
Komatsu, Haruo; and Suzuki, Takashi, 4,878,391, Cl. 74-89.200.

Suzuki, Yukio; Masuda, Ikuro; Iwamura, Masahiro; Kadono, Shinji; Uragami, Akiro; Yoshimura, Masayoshi; and Matsubara, Toshiaki, to Hitachi, Ltd. Bicmos gate array. 4,879,480, Cl. 307-446.000.

Swanson, Scott C., to Sangamo Weston, Inc. Data compression apparatus and method for data recorder with waveform envelope display. 4,879,558, Cl. 341-51.000.

Swartz, Conrad M.: *See*—
Abrams, Richard; and Swartz, Conrad M., 4,878,498, Cl. 128-419.00S.

Swengel Jr., Robert C.; and Wise, James H., to AMP Incorporated. Electrical connector and contact terminal therefor. 4,878,863, Cl. 439-884.000.

Swift, Ronald C.: *See*—
Hall, James B.; Robinson, Martin G.; and Swift, Ronald C., 4,878,988, Cl. 156-600.000.

Swiss Aluminium Ltd.: *See*—
Roggen, Rolf, 4,878,375, Cl. 73-19.000.

Syntex (U.S.A.) Inc.: *See*—
Weng, Litai; Calderhead, David; Khanna, Pyare; and Ullman, Edwin F., 4,879,215, Cl. 435-7.000.

Sysmed, Inc.: *See*—
Broadhurst, John H., 4,879,518, Cl. 328-233.000.

Szabo, Arthur G.: *See*—
Morand, Peter; Drew, Jacinta; Szabo, Arthur G.; and Proulx, Pierre R., 4,879,069, Cl. 260-397.200.

Szporny, Laszlo : *See*—
Fischer, Janos; Dobay, Laszlo ; Major, Mihaly; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Hajos, Gyorgy; and Szporny, Laszlo , 4,879,404, Cl. 560-051.000.

Tabayashi, Isao; Harada, Hiroshi; Inoue, Sadahiro; and Fukutomi, Hiroshi, to Dainippon Ink and Chemicals, Inc. Hot-melt type ink for thermal ink-jet printer. 4,878,946, Cl. 106-27.000.

Tachibana, Juro; and Nishimura, Yoshihide, to Teijin Seiki Company Limited. Warp transfer apparatus. 4,878,279, Cl. 28-203.000.

Tacker, Billy D., to Super Sagless Corporation. Wall proximity chair. 4,878,710, Cl. 297-68.000.

Tada, Manabu: *See*—
Taguchi, Jisei; Miura, Yutaka; Iwanaga, Kenji; and Tada, Manabu, 4,879,536, Cl. 335-128.000.

Tadashi, Kunihira; and Minakuchi, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Speed controller. 4,879,754, Cl. 388-810.000.

Tadema, Jan C., to Wiener & Co. Apparatenbouw B.V. Refining device. 4,878,426, Cl. 99-485.000.

Taguchi, Jisei; Miura, Yutaka; Iwanaga, Kenji; and Tada, Manabu, to Anritsu Corporation. Electromagnetic relay. 4,879,536, Cl. 335-128.000.

Tai, Masaru: *See*—
Sadaki, Hiroshi; Narita Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, 4,879,381, Cl. 540-222.000.

Taiho Kogyo, Ltd.: *See*—
Fukuoka, Tatsuhiko; and Suzuki, Takashi, 4,878,768, Cl. 384-279.000.

Tait, Robert E.: *See*—
Kotikovsky, Alexander P.; and Tait, Robert E., 4,878,272, Cl. 24-196.000.

Tajima, Fumio: *See*—
Endo, Tunehiro; Kato, Nobuaki; Iizuka, Kenichi; and Tajima, Fumio, 4,879,502, Cl. 318-723.000.

Takada, Teruo: *See*—
Tsumiyama, Tatsuo; Shimada, Toshiro; Akagawa, Yoshifumi; Nakamoto, Satoru; and Takada, Teruo, 4,879,341, Cl. 525-66.000.

Takagi, Masamichi; Yano, Keiji; Shibuya, Ichiro; and Morikawa, Minoru, to Nikka Whisky Distilling Co., Ltd. *Escherichia coli Candida maltosa Saccharomyces cerevisiae* shuttle vectors and method for making. 4,879,230, Cl. 435-172.300.

Takagi, Yosuke; Ohata, Yu; Kitahara, Koichi; and Kuramoto, Tsuyoshi, to Kabushiki Kaisha Toshiba. Semiconductor device with isolation between MOSFET and control circuit. 4,879,584, Cl. 357-43.000.

Takagi, Yuuji; Satoh, Isao; Ichinose, Makoto; Fukushima, Yoshihisa; and Kuroki, Yuzuru, to Matsushita Electric Industrial Co., Ltd. Optical disk, optical disk recording and reproducing apparatus and copy preventive method for optical disks. 4,879,704, Cl. 369-14.000.

Takahashi, Akihiro: *See*—
Takeda, Shigeki; and Takahashi, Akihiro, 4,879,563, Cl. 343-725.000.

Takahashi, Hatsuo: *See*—
Iida, Muneo; Honda, Masanobu; Kawamura, Katsumi; Daito, Hiroshi; Miyake, Yoshihiko; Setone, Shouichi; Takahashi, Hatsuo; and Nakanishi, Michihiro, 4,879,618, Cl. 360-106.000.

Takahashi, Hiroaki; Okada, Haruo; Matsumoto, Katsuya; and Umino, Masuo, to Toyo Soda Manufacturing Co., Ltd. Process for measuring stable-type glycated hemoglobin in a sample. 4,879,039, Cl. 210-635.000.

Takahashi, Kenji: *See*—
Hosoi, Yuichi; Arakawa, Satoshi; and Takahashi, Kenji, 4,879,202, Cl. 430-139.000.

Takahashi, Koji: *See*—
Kozuki, Susumu; Takahashi, Koji; Satoh, Keiji; Nagasawa, Kenichi; Edakubo, Hiroo; and Otokawa, Mitsuhiro, 4,879,609, Cl. 360-66.000.

Takahashi, Naoya; Narui, Satoshi; and Matsuzaka, Eiichi, to Nippon Petrochemicals Co., Ltd. Pressure sensitive copy material. 4,879,269, Cl. 503-213.000.

Takahashi, Sankichi: *See*—
Kurokawa, Hideaki; Yamada, Akira; Koseki, Yasuo; Matsuzaki, Harumi; Ebara, Katsuya; Takahashi, Sankichi; Yoda, Hiroaki; Hayashi, Nobuatsu; Okouchi, Isao; Hishinuma, Yukio; and Momma, Naohiro, 4,879,041, Cl. 210-640.000.

Takahashi, Seiji: *See*—
Kurihara, Kazumasa; Takahashi, Seiji; and Kaneko, Yoshio, 4,878,791, Cl. 411-55.000.

Takahashi, Toshiro: *See*—
Ishigaki, Kunio; Takahashi, Toshiro; Mihara, Yuji; Adachi, Keiichi; Ohno, Shigeru; Okada, Masahiro; and Saeki, Naomi, 4,879,204, Cl. 430-512.000.

Takahashi, Toyoharu: *See*—
Ogata, Taizo; Takahashi, Toyoharu; and Koshiba, Kenji, 4,878,982, Cl. 156-361.000.

Takahashi, Tsutomu: *See*—
Masuda, Yasuo; Takahashi, Tsutomu; Takizawa, Yoshio; and Yoshiki, Naokazu, 4,879,185, Cl. 428-687.000.

Takai, Kazuhiko: *See*—
Kikuchi, Sei; Terauchi, Kiyoshi; Takai, Kazuhiko; and Higuchi, Teruo, 4,878,817, Cl. 417-222.00S.

Takamuki, Yasuhiko: *See*—
Yoshida, Kazuhiro; and Takamuki, Yasuhiko, 4,879,207, Cl. 430-564.000.

Takano, Tomiyoshi: *See*—
Kazui, Hidetaka; and Takano, Tomiyoshi, 4,878,275, Cl. 24-436.000.

Takaoka, Naotoshi: *See*—
Sometani, Taro; Takaoka, Naotoshi; Aida, Mitsuo; Kudomi, Mitsuharu; Tanahashi, Yasuhiro; and Aoki, Katsunori, 4,879,509, Cl. 324-108.000.

Takashima, Makoto; Aoki, Yoshihito; and Oikawa, Takahiro, to Yazaki Corporation. Navigation system using angular rate sensor. 4,879,658, Cl. 364-449.000.

Takashima, Yutaka: *See*—
Seto, Izumi; Tsuyuki, Mikio; and Takashima, Yutaka, 4,878,799, Cl. 414-331.000.

Takaya, Yoshikazu; and Yokoyama, Kazuo, to Mitsubishi Paper Mills, Ltd. Light sensitive material for making lithographic printing plate therefrom. 4,879,193, Cl. 430-14.000.

Takeda Chemical Industries, Ltd.: *See*—
Hiraga, Kentaro; and Saji, Yoshiaki, 4,879,293, Cl. 514-249.000.

Takeda, Kyoji; and Suekane, Yoji, to Tanaka Seiki Co., Ltd. Coil winding machine having a tape winder. 4,878,628, Cl. 242-7.080.

Takeda, Shigeki; and Takahashi, Akihiro, to Kyocera Corporation. Circularly polarized complementary antenna with patch and dipole elements. 4,879,563, Cl. 343-725.000.

Takei, Masahiro, to Canon Kabushiki Kaisha. Image pickup apparatus compensating an image signal for variations in color temperature. 4,879,591, Cl. 358-29.00C.

Takemae, Yoshihiro, to Fujitsu Limited. Semiconductor memory device with internal array transfer capability. 4,879,685, Cl. 365-189.110.

Takeuchi, Toyoaki: *See*—
Nakano, Hiroshi; Takeuchi, Toyoaki; Tsunoda, Toshiyuki; and Kinukawa, Masahiko, 4,878,746, Cl. 350-507.000.

Taki, Hideo: *See*—
Sadaki, Hiroshi; Narita Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, 4,879,381, Cl. 540-222.000.

Taki, Kiyoshi: *See*—
Kimura, Hitoshi; Kazama, Shigenori; Shirasaka, Akitoshi; Taki, Kiyoshi; and Manabe, Yukihiro, 4,879,325, Cl. 523-404.000.

Takizawa, Akio; and Saito, Syozo, to Nippon Antenna Co., Ltd. Broadcasting wave reception antenna. 4,879,570, Cl. 343-713.000.

Takizawa, Yoshio: *See*—
Masuda, Yasuo; Takahashi, Tsutomu; Takizawa, Yoshio; and Yoshiki, Naokazu, 4,879,185, Cl. 428-687.000.

Talwar, Anil K.; and Warywoda, Joseph, to Amphenol Corporation. Electrical connector having multi-position housing. 4,878,849, Cl. 439-79.000.

Tamada, Masuo; Kokuryo, Hitoshi; Tamura, Shinsuke; and Ozaki, Hiroshi, to Kabushiki Kaisha Toshiba. Data processing device with high security of stored programs. 4,879,645, Cl. 364-200.000.

Tamazawa, Tsuyoshi: *See*—
Hayashi, Yoshimasa; and Tamazawa, Tsuyoshi, 4,878,469, Cl. 123-195.00A.

Tamura, Minoru; Katayose, Shinji; Murakami, Terukiyo; and Izumi, Hisashi, to Nissan Motor Company, Limited. System and method for electronically controlling a vehicular engine operation having a safe function. 4,879,657, Cl. 364-431.070.

Tamura, Shinsuke: *See*—
Tamada, Masuo; Kokuryo, Hitoshi; Tamura, Shinsuke; and Ozaki, Hiroshi, 4,879,645, Cl. 364-200.000.

Tanahashi, Yasuhiro: *See*—
Sometani, Taro; Takaoka, Naotoshi; Aida, Mitsuo; Kudomi, Mitsuharu; Tanahashi, Yasuhiro; and Aoki, Katsunori, 4,879,509, Cl. 324-108.000.

Tanaka, Michio: *See*—
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Tanaka, Nobuyoshi: *See*—
Sugawa, Shigetoshi; Nakamura, Yoshio; Tanaka, Nobuyoshi; and Ueno, Isamu, 4,879,470, Cl. 250-578.000.

Tanaka Seiki Co., Ltd.: *See*—
Takeda, Kyoji; and Suekane, Yoji, 4,878,628, Cl. 242-7.080.

Tanaka, Sumio: *See*—
Atsumi, Shigeru; Tanaka, Sumio; Saito, Shinji; and Otsuka, Nobauki, 4,879,689, Cl. 365-201.000.

Tanaka, Takashi: *See*—
Yamaguchi, Hisayoshi; Yanagisawa, Tamotsu; Yabuzuka, Masao; Shimizu, Masakatu; and Tanaka, Takashi, 4,879,050, Cl. 252-2.000.

Tandem Computers Incorporated: *See*—
Sanner, Martin W., 4,879,718, Cl. 371-22.300.

Tandy Corporation: *See*—
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Tang, Tom: *See*—
Jucha, Rhett B.; Davis, Cecil J.; Tang, Tom; and Loewenstein, Lee M., 4,878,994, Cl. 156-643.000.

Taniguchi, Hidenobu; and Kawatobi, Tatsuo, to Hitachi, Ltd. Charging system in data communication network. 4,879,742, Cl. 379-111.000.

Taniguchi, Kotaro; Konishi, Toshio; Shimura, Takehiko; Tanimoto, Shigekazu; and Nedzu, Shigeru, to Polyplastics Co., Ltd. Method of manufacturing polyacetal resin film. 4,879,085, Cl. 264-564.000.

Taniguchi, Nobuyuki: *See*—
Kikukawa, Yoshiiku; Nakasa, Masayuki; Yoshida, Tadahiro; Kitaura, Mashio; Nakai, Masaaki; Omaki, Takanobu; and Taniguchi, Nobuyuki, 4,878,751, Cl. 354-410.000.

Taniguchi, Osamu: *See*—
Inaba, Yutaka; and Taniguchi, Osamu, 4,878,740, Cl. 350-337.000.

Tanimoto, Masahiro: *See*—
Sonoyama, Takayasu; Yagi, Shigeo; Kageyama, Bunji; and Tanimoto, Masahiro, 4,879,229, Cl. 435-138.000.

Tanimoto, Shigekazu: *See*—
Taniguchi, Kotaro; Konishi, Toshio; Shimura, Takehiko; Tanimoto, Shigekazu; and Nedzu, Shigeru, 4,879,085, Cl. 264-564.000.

Tanovici, Alexandru, to HEWI Heinrich Wilke GmbH. Roll holder. 4,878,631, Cl. 242-55.200.

Tanzawa, Katsujiro: *See*—
Yamaguchi, Yoshihiro; Watanabe, Kiminori; Nakagawa, Akio; Furukama, Kazuyoshi; Fukuda, Kiyoshi; and Tanzawa, Katsujiro, 4,878,957, Cl. 148-33.300.

Tarallo, Joseph A., to American Telephone and Telegraph Company, AT&T Bell Laboratories. DPSK carrier acquisition and tracking arrangement. 4,879,728, Cl. 375-80.000.

Tari, Gabor; Bado, Zoltan; and Juhasz, Imre. Mechanically fixed acetabular unit for prostheses and implantation device for fixing it into the cotyloid cavity. 4,878,918, Cl. 623-22.000.

Tarleton, E. Russell. Rotary vane nozzle. 4,878,620, Cl. 239-383.000.

Tasaki, Hisashi; and Endo, Kimikazu, to Omron Tateisi Electronics Co. Card-operated telephone. 4,879,744, Cl. 379-144.000.

Tassinario, Giampiero, to Mavilor Systemes S.A. Permanent magnet rotor. 4,879,485, Cl. 310-156.000.

Taub, Bernard: *See*—
Petschke, Glenn H.; and Taub, Bernard, 4,879,365, Cl. 528-49.000.

Taussig, Andrew P.: *See*—
Cherry, Craig D.; Taussig, Andrew P.; and Brooks, Michael T., 4,879,456, Cl. 235-462.000.

Tavecchia, Paolo: *See*—
Chiarino, Dario; Della Bella, Davide; Jommi, Giancarlo; Badone, Domenico; Pagliarin, Roberto; and Tavecchia, Paolo, 4,879,068, Cl. 260-397.000.

Tavernier, Serge M.; Van Beek, Joannes J.; and van Daele, Pierre L., to AGFA-Gevaert N.V. Magnetic carrier particles. 4,879,198, Cl. 430-106.600.

Taylor, Duane F., to Taylor, Janet R. Metal roofing structure. 4,878,331, Cl. 52-519.000.

Taylor, Janet R.: *See*—
Taylor, Duane F., 4,878,331, Cl. 52-519.000.

TDJ Group, Inc., The: *See*—
Rolle, Thomas E.; and Rapp, D. J., 4,878,944, Cl. 75-25.000.

Teetz, Volker; Geiger, Rolf; Urbach, Hansjorg; Becker, Reinhard; and Scholkens, Bernward, to Hoechst Aktiengesellschaft. Process for the preparation of cis, endo-2-azabicyclo-[3.3.0]-octane-3-carboxylic acids. 4,879,403, Cl. 560-38.000.

Teijin Seiki Company Limited: *See*—
Tachibana, Juro; and Nishimura, Yoshihide, 4,878,279, Cl. 28-203.000.

Tekulve, Daniel R.: *See*—
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Telecommunications Radioelectriques et Telephoniques: *See*—
Pirolli, Claude, 4,878,433, Cl. 102-384.000.

Telectronics N.V.: *See—*
Callaghan, Francis J.; and Vollmann, William, 4,878,497, Cl. 128-419.0PG.

Telefunken electronic GmbH: *See—*
Brostrom, Doris; and Ryman, Lennart, 4,879,586, Cl. 357-54.000.
Mattfeld, Johann, 4,879,522, Cl. 330-263.000.

Tempco, Dale A., to Westinghouse Electric Corp. Mounting bracket for a conductor of electrical apparatus. 4,878,639, Cl. 248-73.000.

Temple, Stephen: *See—*
Bartky, W. Scott; Paton, Anthony D.; Temple, Stephen; and Michaelis, A. John, 4,879,568, Cl. 346-140.00R.

Tengstrand, Gorand; Lindblom, Boris; Nilsson, Jerry; and Lunden, Peter, to Satt Communications AB. Sound emitter. 4,878,561, Cl. 181-188.000.

Tensho Electric Industrial Co., Ltd.: *See—*
Kamayachi, Yuzo, 4,878,489, Cl. 128-6.000.

Teranishi, Shunichi; and Hayashi, Takeshi, to Aisin Seiki Kabushiki Kaisha. Cartridge transfer mechanism for a disk file apparatus. 4,879,615, Cl. 369-34.000.

Terauchi, Kiyoshi: *See—*
Kikuchi, Sei; Terauchi, Kiyoshi; Takai, Kazuhiko; and Higuchi, Teruo, 4,878,817, Cl. 417-222.00S.

Terneu, Robert: *See—*
Thomas, Jean-Francois; Terneu, Robert; Van Cauter, Albert; and Van Laethem, Robert, 4,878,934, Cl. 65-60.520.

Terzian, Rouben T., to Marvin Glass & Associates. Selectively rocking or walking doll. 4,878,874, Cl. 446-355.000.

Teshima, Daisuke: *See—*
Koizumi, Satoru; Teshima, Daisuke; and Katayama, Yoshio, 4,879,613, Cl. 360-92.000.

TESLA, koncernovy podnik: *See—*
Slavata, Bohumil, 4,879,573, Cl. 355-125.000.

Tessek sdruzeni Praha: *See—*
Puschel, Petr; Formanek, Zdenek; Krivanek, Vaclav; Pokorny, Antonin; Vlasakova, Anna; and Stuchikova, Alena, 4,879,246, Cl. 436-145.000.

Tessier, Jean; Demoute, Jean-Pierre; and Cadiergue, Joseph, to Roussel Vclaf. Certain oximino-cyclopropane carboxylates having insecticidal activity. 4,879,302, Cl. 514-351.000.

Texaco Inc.: *See—*
Bhattacharya, Ajit K., 4,879,266, Cl. 502-164.000.
Matthews, Leonard A.; Powers, William J., III; Przybyla, Henry M.; Whittle, Joanne R.; and Perciful, Jerry C., 4,879,053, Cl. 252-25.000.

Texas A&M University System, The: *See—*
Smith, Gale E.; and Summers, Max D., 4,879,236, Cl. 435-235.000.

Texas Instruments Incorporated: *See—*
Arnquist, David C., 4,878,705, Cl. 294-116.000.
Bell, Kenneth M., 4,879,524, Cl. 330-288.000.
Fisher, Wayne G., 4,879,258, Cl. 437-225.000.
Garcia, Virgilio N., 4,879,683, Cl. 365-189.050.
Jucha, Rhett B.; Davis, Cecil J.; Tang, Tom; and Loewenstein, Lee M., 4,878,994, Cl. 156-643.000.
Luckett, Dirk R.; and Parkerson, James P., 4,879,680, Cl. 365-154.000.
Mitchell, Allan T.; Tigelaar, Howard L.; Garg, Shaym G.; and Rao, Kalipatnam V., 4,878,996, Cl. 156-653.000.
Purdes, Andrew J., 4,878,989, Cl. 156-613.000.

Thaniyavarn, Suwat, to TRW Inc. Electrooptically tunable phase-locked laser array. 4,878,724, Cl. 350-96.140.

Thanner, Arthut. Ankle supporting sleeve. 4,878,505, Cl. 128-882.000.

Tharp, Douglas B.: *See—*
Myers, Larry F.; Tharp, Douglas B.; and Holl, Ralph H., 4,878,437, Cl. 105-451.000.

Theodoridis, George, to FMC Corporation. Herbicides. 4,878,941, Cl. 71-93.000.

Theopold, Klaus H.; and Byrne, Erin K., to Cornell Research Foundation, Inc. Novel gallium arsenide precursor and low temperature method of preparing gallium arsenide therefrom. 4,879,397, Cl. 556-11.000.

Thermo King Corporation: *See—*
Hanson, Jay L.; and Howland, Leland L., 4,878,465, Cl. 123-179.0BG.
Viegas, Herman H., 4,878,360, Cl. 62-239.000.

Theurer, Josef, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H. Mobile tie exchange machine arrangement. 4,878,435, Cl. 104-9.000.

Thibodeaux, L. J.: *See—*
Guillot, Walter K.; and Brinkman, Robert D., 4,879,590, Cl. 358-10.000.

Thiel, Clifford G.: *See—*
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Thiess Contractors Pty. Ltd.: *See—*
Cawley, Scott A.; and Vidler, Malcolm E., 4,878,596, Cl. 220-331.000.

Thirion, Christian: *See—*
Boucard, Michel; Thirion, Christian; and Maurel, Christian, 4,879,630, Cl. 361-386.000.

Thomas J. Lipton Inc.: *See—*
Butcher, Ian; Carrick, Gordon S.; and Hillman, Kevin P., 4,878,425, Cl. 99-450.200.

Thomas, Jean-Francois; Terneu, Robert; Van Cauter, Albert; and Van Laethem, Robert, to Glaverbel. Process and apparatus for coating glass. 4,878,934, Cl. 65-60.520.

Thomas, Lynn B., Sr.: *See—*
Nelson, Thomas L.; and Thomas, Lynn B., Sr., 4,878,280, Cl. 28-274.000.

Thompson, Allen O. All season fuel filter. 4,879,035, Cl. 210-416.400.

Thompson, Joseph: *See—*
Karasin, Craig E.; and Thompson, Joseph, 4,878,774, Cl. 401-15.000.

Thomsen, Karl V.; Darcy, John J.; Griswold, Augustus W.; Haritonoff, Boris W.; and Pond, Jacob, to Xerox Corporation. Apparatus for preparing belts. 4,878,985, Cl. 156-459.000.

Thomson-CSF: *See—*
Diamand, Felix, 4,879,581, Cl. 357-3.000.

Thomson, Meredith C., to Kusel Equipment Company. Method of washing and cooling a dairy product. 4,879,129, Cl. 426-506.000.

Thorn EMI plc: *See—*
Pavelin, Ernest J., 4,879,638, Cl. 362-294.000.

Thorpe, Gary H. G. H.: *See—*
Whitehead, Thomas P.; Thorpe, Gary H. G. H.; Kricka, Larry J.; Gibbons, John E. C.; and Bunce, Roger A., 4,879,097, Cl. 422-67.000.

Thurston, John W. Multihull vessels. 4,878,447, Cl. 114-61.000.

Tieke, Bernd, to Ciba-Geigy Corporation. Dehydrogenated polycyclopentadiene. 4,879,350, Cl. 525-332.100.

Tigelaar, Howard L.: *See—*
Mitchell, Allan T.; Tigelaar, Howard L.; Garg, Shaym G.; and Rao, Kalipatnam V., 4,878,996, Cl. 156-653.000.

Tigges, Burkhard; and Brasse, Dierk, to Werner Turck GmbH & Co., KG. Inductive proximity switch oscillator having same activating range for ferrous and nonferrous metals. 4,879,531, Cl. 331-65.000.

Tilton, Richard A.: *See—*
Braski, Michael T.; Wissman, Charles H.; Tilton, Richard A.; and Robusto, Paul F., 4,879,721, Cl. 372-18.000.

Timmerman, Daniel: *See—*
Vermeersch, Joan T.; Timmerman, Daniel; Vandenabeele, Hubert; and Vervecken, Jacques L., 4,879,209, Cl. 430-623.000.

Tjoeng, Foe S.; and Adams, Steven P., to Mosanto Company. Novel platelet-aggregation inhibitors. 4,879,313, Cl. 514-616.000.

TMC Corporation: *See—*
Stritzl, Karl; Luschnig, Franz; Riegler, Andreas; Wurthner, Hubert; and Freisinger, Henry, 4,878,687, Cl. 280-605.000.

Toda, Hiroshi, to Aisin Seiki Kabushiki Kaisha. Brake control device for vehicles. 4,878,715, Cl. 303-110.000.

Todorski, Zenon. Plate heat exchanger and heating stove with the plate heat exchanger. 4,878,483, Cl. 126-523.000.

Tofsland, Kenneth M.; Morgan, Jeffrey S.; Grytten Holm, Eric G.; and Jaroszczyk, Tadeusz, to Nelson Industries Inc. Liquid-gas separator. 4,878,929, Cl. 55-486.000.

Toft, Mark A.; Brazdil, James F., Jr.; and Glaeser, Linda C., to Standard Oil Company, The. The Method of making catalyst and catalyst precursor containing vanadium and antimony. 4,879,264, Cl. 502-8.000.

Tohill, Henry J.: *See—*
Hensley, John J.; Waldhelm, Christian M.; Tohill, Henry J.; and Kubarych, Kenneth G., 4,878,678, Cl. 277-235.00A.

Tohyama, Atsuko: *See—*
Nishimura, Shigeoki; Fujita, Kazunori; Sugimoto, Hiroyuki; Tohyama, Atsuko; Ebato, Noboru; and Matsuda, Shinpei, 4,879,192, Cl. 429-198.000.

Tokai Corporation: *See—*
Nitta, Tomio, 4,878,833, Cl. 431-146.000.
Nitta, Tomio, 4,878,834, Cl. 431-152.000.
Nitta, Tomio, 4,878,836, Cl. 431-277.000.

Tokuda, Kuniaki; Morii, Seiji; and Yamanishi, Kazuhiko, to Wako Pure Chemical Industries, Ltd. Process for determination of γ-GTP activity. 4,879,221, Cl. 435-15.000.

Tokushige, Kazuo, to NEC Corporation. Dynamic memory circuit with improved sensing scheme. 4,879,692, Cl. 365-230.030.

Tokyo Automatic Machinery Works, Ltd.: *See—*
Ogata, Taizo; Takahashi, Toyoharu; and Koshiba, Kenji, 4,878,982, Cl. 156-361.000.

Tokyo Electric Co., Ltd.: *See—*
Kurimoto, Yukuo; and Endo, Takayoshi, 4,879,650, Cl. 364-405.000.
Nishida, Manabu, 4,878,771, Cl. 400-70.000.

Tokyo Keiki Co. Ltd.: *See—*
Homma, Kazuya; Nogi, Hiroshi; Yamada, Koichi; Kitazume, Masahiro; Uzawa, Masamitsu; and Aoki, Makoto, 4,878,754, Cl. 356-376.000.

Tollitte, Francois G.: *See—*
Muller, Jean F.; Tollitte, Francois G.; Krier, Gabriel; Dominiak, Serge; Eberhardt, Andre; and Berveiller, Marcel, 4,879,467, Cl. 250-288.000.

Tomlinson, Robert K., to Monier Redland Limited. Turbine mixer. 4,878,759, Cl. 366-56.000.

Tomy Kogyo Co., Inc.: *See—*
Yamaguchi, Hidehiko; Minami, Kouichi; and Kobayashi, Nobuo, 4,878,873, Cl. 446-321.000.
Yamane, Yuji; and Nishikawa, Hideya, 4,878,869, Cl. 446-130.000.

Tonen Sekiyukagaku Kabushiki Kaisha: *See—*
Kagawa, Seiji, 4,878,974, Cl. 156-85.000.

Tonokawa, Hiroshi: *See—*
Nakamura, Masao; and Tonokawa, Hiroshi, 4,878,520, Cl. 138-149.000.

Toray Industries: *See—*
Karasawa, Hiroo; Kometani, Kiichi; and Okita, Kiyomi, 4,879,328, Cl. 524-109.000.

Torazzina, Aldo: *See—*
Botti, Edoardo; and Torazzina, Aldo, 4,879,526, Cl. 330-295.000.
Toro Company, The: *See—*
Roy, Michael G.; Ullrich, Helmut J.; Beattle, John M.; and Sinden, Jimmie D., 4,878,340, Cl. 56-249.000.
Torrington Company, The: *See—*
Fredericksen, Arnold E.; and Richtmeyer, Robert D., 4,878,463, Cl. 123-90.410.
Tosti, John. Replaceable, reusable golf club grip. 4,878,667, Cl. 273-81.200.
Toutant, Roy T.; Perry, David S.; Brennan, Michael A.; Kreko, James E.; and Dilk, Mark A., to General Electric Company. Adaptive roll formed system and method. 4,878,368, Cl. 72-9.000.
Toyo Chemical Co., Ltd.: *See—*
Asakura, Hiroshi, 4,878,976, Cl. 156-190.000.
Toyo Ink Mfg. Co., Ltd.: *See—*
Hirota, Fumio; Kado, Tsutomu; Oku, Shosuke; and Watanabe, Noboru, 4,879,335, Cl. 524-495.000.
Toyo Soda Manufacturing Co., Ltd.: *See—*
Takahashi, Hiroaki; Okada, Haruo; Matsumoto, Katsuya; and Umino, Masuo, 4,879,039, Cl. 210-635.000.
Toyofuku, Kunitaka; Sato, Hiroaki; and Michikawa, Kohei, to Oji Paper Co., Ltd. Laser-sensitive electrophotographic material. 4,879,195, Cl. 430-89.000.
Toyoma Chemical Company, Ltd.: *See—*
Sadaki, Hiroshi; Narita Hirokazu; Imaizumi, Hiroyuki; Konishi, Yoshinori; Inaba, Takihiro; Hirakawa, Tatsuo; Taki, Hideo; Tai, Masaru; Watanabe, Yasuo; and Saikawa, Isamu, 4,879,381, Cl. 540-222.000.
Toyota Jidosha Kabushiki Kaisha: *See—*
Baba, Youichiro; Hashimoto, Hirofumi; and Watanabe, Masayuki, 4,878,649, Cl. 251-121.000.
Horiki, Seinosuke; Makino, Reiji; and Iwata, Hisami, 4,879,158, Cl. 428-159.000.
Isobe, Toshiaki; and Oba, Hidehiro, 4,878,386, Cl. 73-861.220.
Nagase, Masaomi; Ito, Yoshiyasu; Kizaki, Mikio; Matsuno, Kiyotaka; Tsukamoto, Keisuke; and Kobayashi, Fumiaki, 4,879,673, Cl. 364-571.010.
Trackmobile, Inc.: *See—*
Lich, Richard L.; and Siewert, Robert L., 4,878,436, Cl. 105-72.200.
Transensory Devices, Inc.: *See—*
Jerman, John H., 4,879,587, Cl. 357-55.000.
Tratz, Herbert; Riedle, Klaus; and Loesel, Georg, to Siemens Aktiengessellschaft. Method and plant for thermal waste disposal. 4,878,440, Cl. 110-233.000.
Trebnick, Ralph J. Bicycle wheel activated reflector. 4,878,734, Cl. 350-99.000.
Trek Medical Products, Inc.: *See—*
Sinnett, Kevin B., 4,878,487, Cl. 128-20.000.
Trenkle, Robert W.: *See—*
Mookherjee, Braja D.; Trenkle, Robert W.; Calderone, Nicholas; and Sands, Keith P., 4,879,271, Cl. 512-20.000.
Tretorn AB: *See—*
Bogaty, Robert D., 4,878,300, Cl. 36-35.00R.
Trimble, Lloyd E.: *See—*
Radwanski, Fred R.; Trimble, Lloyd E.; Smith, Roland C.; and Connor, Linda A., 4,879,170, Cl. 428-233.000.
Triten Corporation: *See—*
Shaw, Danial G.; and MacCline, Billy, 4,878,546, Cl. 173-163.000.
Troger, Walter: *See—*
Leuthold, Karl; Maul: Herbert; Troger, Walter; and Serester, Alexander, 4,878,626, Cl. 241-57.000.
Trooskin, Stanley Z.: *See—*
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TRW Inc.: *See—*
Brock, John C., 4,879,468, Cl. 250-374.000.
Silver, Arnold H., 4,879,488, Cl. 341-171.000.
Thaniyavarn, Suwat, 4,878,724, Cl. 350-96.140.
TRW Repa GmbH: *See—*
Mitzkus, Jurgen; and Wiesner, Dieter, 4,878,689, Cl. 280-731.000.
TRW Vehicle Safety Systems Inc.: *See—*
Kitokovsky, Alexander P., 4,878,271, Cl. 24-194.000.
Kotikovsky, Alexander P.; and Tait, Robert E., 4,878,272, Cl. 24-196.000.
Tsai, Frank W., to Kinetics Technology International. Method of operating a furnace hydrocarbon converter. 4,879,020, Cl. 208-130.000.
Tsubota, Yasumasa: *See—*
Shibahata, Yasuji; Fukunaga, Yukio; Tsubota, Yasumasa; Uno, Takaaki; and Okuyama, Yuji, 4,878,557, Cl. 180-140.000.
Tsuchiya, Kanji; and Ono, Shizumi, to Seikensha Company Limited. Apparatus for inactivation of enzymes in oil seeds. 4,879,132, Cl. 426-634.000.
Tsuchiya, Shuichi: *See—*
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Tsuchiya, Toshio: *See—*
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Tsukahara, Takashi, to Fuji Electric Co., Ltd. Power converter for driving an AC motor at a variable speed. 4,879,639, Cl. 363-37.000.
Tsukamoto, Keisuke: *See—*
Nagase, Masaomi; Ito, Yoshiyasu; Kizaki, Mikio; Matsuno, Kiyotaka; Tsukamoto, Keisuke; and Kobayashi, Fumiaki, 4,879,673, Cl. 364-571.010.
Tsukioka, Yasunobu. Method of syringing reaction bead in examination of blood or the like and apparatus thereof. 4,879,242, Cl. 436-54.000.
Tsumiyama, Tatsuo; Shimada, Toshiro; Akagawa, Yoshifumi; Nakamoto, Satoru; and Takada, Teruo, to Ube Industries, Ltd. Polyester/polyamide resin compositions containing grafted polyolefin and molded products thereof. 4,879,341, Cl. 525-66.000.
Tsunekawa, Yuzo; Ishida, Yukio; and Shiino, Tatsuo, to Fuji Photo Film Co., Ltd. Method of continuously assembling chemical analysis slides. 4,878,971, Cl. 156-70.000.
Tsunoda, Toshiyuki: *See—*
Nakano, Hiroshi; Takeuchi, Toyoaki; Tsunoda, Toshiyuki; and Kinukawa, Masahiko, 4,878,746, Cl. 350-507.000.
Tsunoda, Yoshito: *See—*
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Tsuruoka, Kazuhiro: *See—*
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Tsutsui, Koichi; Ikeda, Shoji; and Ueki, Koji, to Nippon Paint Co., Ltd. Corona discharge treatment apparatus. 4,879,100, Cl. 422-186.050.
Tsuyuki, Mikio: *See—*
Seto, Izumi; Tsuyuki, Mikio; and Takashima, Yutaka, 4,878,799, Cl. 414-331.000.
Tsuzuki, Yukio; and Yamaoka, Masami, to Nippondenso Co., Ltd. Method of manufacturing a DMOS. 4,879,254, Cl. 437-41.000.
Tu, Charles W.: *See—*
Johnston, Wilbur D., Jr.; and Tu, Charles W., 4,878,956, Cl. 148-33.300.
Tuckey, Charles H., to Walbro Corporation. In-tank fuel reservoir with fuel vapor separation. 4,878,518, Cl. 137-448.000.
Tuckey, Charles H., to Walbro Corporation. In-tank fuel reservoir with fuel vapor separation. 4,878,816, Cl. 417-76.000.
Tung, Po L. Stepless tilting device for umbrella. 4,878,509, Cl. 135-20.00M.
Tunningley, William A.; Tunnungley, Martha A.; and Pupulidy, Emanuel M. Combination tool. 4,878,260, Cl. 7-129.000.
Tunnungley, Martha A.: *See—*
Tunningley, William A.; Tunnungley, Martha A.; and Pupulidy, Emanuel M., 4,878,260, Cl. 7-129.000.
Turner, Andrew D., to United Kingdom Atomic Energy Authority. Liquid treatment process. 4,879,006, Cl. 204-1.500.
Turner, John E.; Rutledge, David L.; and Darling, Roy D., to Lattice Semiconductor Corporation. In-system programmable logic device. 4,879,688, Cl. 365-201.000.
Tustaniwskyj, Jerry I.; and Halkola, Kyle G., to Unisys Corporation. Liquid cooled multi-chip integrated circuit module incorporating a seamless compliant member for leakproof operation. 4,879,629, Cl. 361-385.000.
Tuttle, Billy W., to GTE Products Corporation. Fluorescent lamp starter assembly. 4,879,494, Cl. 315-61.000.
Tyree, Lewis, Jr., to Liquid Carbonic Corporation. Chiller with expanding spiral conveyor belt. 4,878,362, Cl. 62-381.000.
Ube Industries, Ltd.: *See—*
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Waku, Yoshiharu; Yoshioka, Hideho; Oba, Hiroyoshi; and Fujino, Kiyoshi, 4,879,074, Cl. 264-24.000.
Ucci, Pompelio A.: *See—*
Blyth, Randolph C.; and Ucci, Pompelio A., 4,879,180, Cl. 428-395.000.
Uchida, Hiroyasu; and Ueda, Kazuhiko, to Mazda Motor Corporation. Intake system for V-type internal combustion engine. 4,878,460, Cl. 123-52.0MV.
Uchida, Yukio: *See—*
Sakai, Nobuhiko; Uchida, Yukio; Wada, Eizo; and Hirose, Yusuke, 4,878,960, Cl. 148-127.000.
Uchikawa, Akira: *See—*
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Yamamoto, Haruhiko; Suzuki, Masahiro; Udagawa, Yoshiaki; Nakata, Mitsuhiko; Katsuyama, Koji; Ono, Izumi; and Kikuchi, Shunichi, 4,879,632, Cl. 361-386.000.
Uddo Jr., Joseph F.; and Breaux, John R. Secretion contaminated indwelling tube closed removal and disposal system. 4,878,762, Cl. 383-33.000.
Ueda, Kazuhiko: *See—*
Uchida, Hiroyasu; and Ueda, Kazuhiko, 4,878,460, Cl. 123-52.0MV.
Ueki, Koji: *See—*
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Uemura, Haruo: *See—*
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Ueno, Isamu: *See—*
Sugawa, Shigetoshi; Nakamura, Yoshio; Tanaka, Nobuyoshi; and Ueno, Isamu, 4,879,470, Cl. 250-578.000.
Ugro, Josef V., Jr., to Minnesota Mining and Manufacturing Company. Device for exposing colorant to be transferred. 4,879,175, Cl. 428-321.500.
Uhlig, Albert R., to Plastic Technologies, Inc. Tamper resistant wide mouth package with labyrinth seal. 4,878,595, Cl. 220-306.000.
Ullman, Edwin F.: *See—*
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Ullmann, Klaus, to Windmoller & Holscher. Process and apparatus for severing and subsequently stacking flat articles made of plastic film and preferably consisting of double bags. 4,878,888, Cl. 493-204.000.
Ullrich, Helmut J.: *See—*
Roy, Michael G.; Ullrich, Helmut J.; Beattle, John M.; and Sinden, Jimmie D., 4,878,340, Cl. 56-249.000.
Umeda, Shigeru, to Obara Corporation. Piston actuated welding gun with pivoting arm. 4,879,447, Cl. 219-86.250.
Umino, Masuo: *See—*
Takahashi, Hiroaki; Okada, Haruo; Matsumoto, Katsuya; and Umino, Masuo, 4,879,039, Cl. 210-635.000.
Umio, Suminori; Kozasa, Shizuo; and Yabuuchi, Takahiro, to Hoei Pharmaceutical Co., Ltd.; and Research Institute for Production Developement. Antiallergic and antiinflammatory benzothiazolinone derivatives. 4,879,301, Cl. 514-321.000.
Une, Ryuzo: *See—*
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Union Carbide Chemicals and Plastics Company Inc.: *See—*
Doumaux, Arthur R., Jr.; and Nelson, James R., 4,879,401, Cl. 558-488.000.
Foster, George N.; Petty, Herbert E.; and Blevins, Charles H., II, 4,879,378, Cl. 556-439.000.
Union Carbide Corporation: *See—*
Anderson, John E., 4,878,829, Cl. 431-8.000.
Phade, Ravindra F.; and Handley, James R., 4,878,932, Cl. 62-24.000.
Union Oil Company of California: *See—*
Ghandehari, Mohammad H., 4,878,958, Cl. 148-103.000.
Simpson, Howard D.; and Borgens, Pauline B., 4,879,265, Cl. 502-211.000.
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Union Special Corporation: *See—*
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Brewer, Arthur D., 4,879,276, Cl. 514-43.000.
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Wang, Chang Y.; and Wang, James J. G., 4,879,211, Cl. 435-5.000.
Wang, Chang Y.; and Wang, James J. G., 4,879,212, Cl. 435-5.000.
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United States of America
Agriculture: *See—*
Klesius, Phillip H.; and Cross, Debra A., 4,878,895, Cl. 604-49.000.
Air Force: *See—*
Foster, Joseph C., Jr.; and Bilek, Andrew G., 4,878,415, Cl. 89-34.000.
Army: *See—*
Bennett, Stephen H., 4,879,154, Cl. 428-81.000.
Mikhail, Ameer G., 4,878,432, Cl. 102-309.000.
Stern, Richard A.; and Babbitt, Richard W., 4,879,562, Cl. 343-700.0MS.
Energy: *See—*
Halverson, Danny C.; Lum, Beverly Y.; and Munir, Zuhair A., 4,879,262, Cl. 501-87.000.
Luce, Robert G.; McCoy, Daniel F.; Merriman, Floyd C.; and Gregurech, Steve, 4,879,086, Cl. 376-173.000.
Wise, Marcus B.; and Buchanan, Michelle V., 4,879,472, Cl. 250-379.000.
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Morgan, Gene E.; and Dyer, Gerald E., 4,879,446, Cl. 219-75.000.
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Londino, Joseph M., Jr., 4,878,296, Cl. 33-227.000.
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U.S. Philips Corporation: *See—*
Knapp, Alan G.; Lamport, Daphne L.; Washington, Derek; and Woodhead, Alfred W., 4,879,496, Cl. 315-366.000.
Mannschke, Lothar P., 4,878,728, Cl. 350-96.170.
Mehlkopf, Antoon F.; and Den Boef, Johannes H., 4,879,514, Cl. 324-309.000.
Salembier, Philippe; and Lamnabhi, Moustanir, 4,879,729, Cl. 375-104.000.
Sauerwald, Wilhelm A.; DeWilde, Johannes; Van Eerdewijk, Karel J. E.; Beenker, Franciscus P. M.; and Segers, Marinus T. M., 4,879,717, Cl. 371-22.300.
Schleimann-Jensen, Lars J.; Engding, Alf E.; and Astrom, Anders F., 4,879,460, Cl. 250-230.00R.
Schroth, Volkmar; and Levin, Horst, 4,879,529, Cl. 331-14.000.
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Grantham, Daniel H., 4,879,627, Cl. 361-283.000.
Hufnagel, Nick L., 4,878,618, Cl. 239-265.390.
Jorgensen, Stephen W., 4,878,811, Cl. 416-215.000.
Kromrey, Robert V., 4,879,073, Cl. 264-22.000.
McLean, Howard J., 4,878,283, Cl. 29-163.600.
Novotny, Rudolph J., 4,878,617, Cl. 239-265.350.
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Wiegand, Walter J., Jr.; and Bullis, Robert H., 4,878,383, Cl. 73-293.000.
Universite de Metz: *See—*
Muller, Jean F.; Tollitte, Francois G.; Krier, Gabriel; Dominiak, Serge; Eberhardt, Andre; and Berveiller, Marcel, 4,879,467, Cl. 250-288.000.
University of Houston-University Park, The: *See—*
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University of North Carolina: *See—*
DiBianca, Frank A., 4,879,469, Cl. 250-374.000.
University of Oklahoma, The Board of Regents for the: *See—*
Magarian, Robert A.; and Pento, Joseph T., 4,879,315, Cl. 514-754.000.
University of Pennsylvania: *See—*
Cutler, Winnifred B.; Preti, George; and Huggins, George R., 4,879,244, Cl. 436-65.000.
University of Saskatchewan: *See—*
Silversides, David W.; Mapletoft, Reuben J.; Murphy, Bruce D.; and Misra, Virkam, 4,879,112, Cl. 424-85.900.
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Ophir, Jonathan; and Shattuck, David P., 4,878,500, Cl. 128-660.010.
Unland, Georg, to Krupp Polysius AG. Method for the production of cement clinker from semi-wet raw material. 4,878,949, Cl. 106-100.000.
Uno, Takaaki: *See—*
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Uosaki, Yoichi: *See—*
Saito, Hiromitsu; Uosaki, Yoichi; Sato, Akira; Hirata, Tadashi; Morimoto, Makoto; and Ashizawa, Tadashi, 4,879,386, Cl. 544-343.000.
Uppco Inc.: *See—*
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Wreede, John E.; Scott, James E.; and Upper, Richard B., 4,878,719, Cl. 350-3.750.
Ura, Hiroaki; and Shiozawa, Takao, to Konica Corporation. Sheet conveyance apparatus. 4,878,657, Cl. 271-9.000.
Urabe, Shigeharu, to Fuji Photo Film Co., Ltd. Process for preparing silver halide grains. 4,879,208, Cl. 430-569.000.
Uragami, Akiro: *See—*
Suzuki, Yukio; Masuda, Ikuro; Iwamura, Masahiro; Kadono, Shinji; Uragami, Akiro; Yoshimura, Masayoshi; and Matsubara, Toshiaki, 4,879,480, Cl. 307-446.000.
Urashin, Masayuki: *See—*
Doi, Motomichi; Izushi, Minetoshi; Kawaike, Kazuhiko; and Urashin, Masayuki, 4,878,820, Cl. 418-203.000.
Urbach, Hansjorg: *See—*
Teetz, Volker; Geiger, Rolf; Urbach, Hansjorg; Becker, Reinhard; and Scholkens, Bernward, 4,879,403, Cl. 560-38.000.
Usami, Toshiro, to Kabushiki Kaisha Toshiba. Semiconductor device. 4,879,585, Cl. 357-49.000.
Ushikubo, Kohei, to Sanden Corporation. Data exchanging system using a bar code reader. 4,879,540, Cl. 235-385.000.
Utzinger, Gustav E. Method and apparatus for counter current liquid-liquid extraction. 4,879,037, Cl. 210-634.000.
Uzawa, Masamitsu: *See—*
Homma, Kazuya; Nogi, Hiroshi; Yamada, Koichi; Kitazume, Masahiro; Uzawa, Masamitsu; and Aoki, Makoto, 4,878,754, Cl. 356-376.000.
Vacuum Barrier Corporation: *See—*
Stearns, Thornton; and Blanton, Russell W., 4,878,354, Cl. 62-63.000.
Vagi, Uwe: *See—*
Merger, Franz; Frank, Juergen; Vagi, Uwe; and Fischer, Rolf, 4,879,406, Cl. 560-211.000.
Valentin, Jean-Pascal; Maitre, Pierre; and Kazahaya, Masahiro, to Fischer & Porter Company. Laser welding technique. 4,879,450, Cl. 219-121.640.
Valentini, Robert F.: *See—*
Aebischer, Patrick; Valentini, Robert F.; and Galletti, Pierre M., 4,878,913, Cl. 623-12.000.
Valeo: *See—*
Gay, Christian; and Lassiaz, Philippe, 4,878,572, Cl. 192-98.000.
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Valeo Systemes D'Essuyage: *See—*
Raymond, Bernard, 4,878,263, Cl. 15-250.320.

Vallee, Bert L.: *See*—
Alderman, Edward M.; Fett, James W.; and Vallee, Bert L., 4,879,222, Cl. 435-68.000.
Valmet-Sentrol Ltd.: *See*—
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Pryslak, August J., 4,879,547, Cl. 340-686.000.
Van Beek, Joannes J.: *See*—
Tavernier, Serge M.; Van Beek, Joannes J.; and van Daele, Pierre L., 4,879,198, Cl. 430-106.600.
Van Bentem, Fransiscus C. A. Outboard thruster with direct drive hydraulic motor. 4,878,864, Cl. 440-5.000.
Van Biesen, Jozef A.; Daes, Guido F.; and Verstringe, Jan B., to Agfa-Gevaert N.V. Electrophotographic method for reversal or positive-positive image formation. 4,879,196, Cl. 430-100.000.
Van Cauter, Albert: *See*—
Thomas, Jean-Francois; Terneu, Robert; Van Cauter, Albert; and Van Laethem, Robert, 4,878,934, Cl. 65-60.520.
van Daele, Pierre L.: *See*—
Tavernier, Serge M.; Van Beek, Joannes J.; and van Daele, Pierre L., 4,879,198, Cl. 430-106.600.
Vandenabeele, Hubert: *See*—
Vermeersch, Joan T.; Timmerman, Daniel; Vandenabeele, Hubert; and Vervecken, Jacques L., 4,879,209, Cl. 430-623.000.
van der Veer, Harry M., to Farmtec B.V. Device and method for supplying, very accurately metered, a quanitity of food to small livestock. 4,878,455, Cl. 119-57.500.
Van Dest, Jean-Claude, to Glaenzer-Spicer. Fixed homokinetic joint for transmissions of driving wheels of automobile vehicles. 4,878,881, Cl. 464-111.000.
Van Eerdewijk, Karel J. E.: *See*—
Sauerwald, Wilhelm A.; DeWilde, Johannes; Van Eerdewijk, Karel J. E.; Beenker, Franciscus P. M.; and Segers, Marinus T. M., 4,879,717, Cl. 371-22.300.
Van Hoorn, Antonius I.: *See*—
De Mon, Bob; and Van Hoorn, Antonius I., 4,879,049, Cl. 210-777.000.
van Laar, Hermanus G.; Lea, Richard H.; and Payne, Beverley, to Shell Oil Company. Removal of organic acids from freshly produced bitumen. 4,879,014, Cl. 204-190.000.
Van Laethem, Robert: *See*—
Thomas, Jean-Francois; Terneu, Robert; Van Cauter, Albert; and Van Laethem, Robert, 4,878,934, Cl. 65-60.520.
Vanlerberghe, Guy; Sebag, Henri; Lagoutte, Michele; and Grollier, Jean F., to L'Oreal. Foaming cosmetic compositions. 4,879,107, Cl. 424-70.000.
Van Lommen, Guy R. E.: *See*—
De Bruyn, Marcel F. L.; Van Lommen, Guy R. E.; and Lutz, William R., 4,878,940, Cl. 71-92.000.
Van Order, Kim L.: *See*—
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vanPeppen, Jacobus C. L.: *See*—
Jove, Stephen A.; Klaassen, Klaas B.; Nomura, Calvin S.; and vanPeppen, Jacobus C. L., 4,879,610, Cl. 360-67.000.
van Swam, Leo F.; Blair, Thomas R.; and Ho, Quang D., to Advanced Nuclear Fuels Corporation. Method and apparatus for detecting failed fuel rods (ENC-189). 4,879,088, Cl. 376-252.000.
Van Tuyl, James E.; and Larson, Clifford A. Two piece adjustable, reusable metal door frame. 4,878,325, Cl. 52-217.000.
van Vuuren, Willem N. J.: *See*—
Sapienza, Samuel J., IV; van Vuuren, Willem N. J.; Shirey, Benjamin G.; and Wakeman, Russell J., 4,878,461, Cl. 123-90.150.
Vassiliades, Anthony E. Fingerprinting compositions, systems and methods. 4,879,134, Cl. 427-1.000.
Vaughan, David E. W., to Exxon Research and Engineering Company. Composition and process for preparing ECR-30. 4,879,103, Cl. 423-329.000.
Vecchietti, Vittorio: *See*—
Giordani, Antonio; and Vecchietti, Vittorio, 4,879,300, Cl. 514-317.000.
Ven Erden, Donald L., to Minigrip, Inc. Transverse zipper bag material and method of and means for making same. 4,878,987, Cl. 156-519.000.
Verboom, Johannes J.: *See*—
Getreuer, Kurt W.; Verboom, Johannes J.; and Sonneville, Pierre R., 4,879,707, Cl. 369-46.000.
Getreuer, Kurt W.; and Verboom, Johannes J., 4,879,708, Cl. 369-46.000.
Verheyden, G. M. C., Jr., to A.P.T. Anlagen fur Pyrotechnik GmbH. Process for the thermal treatment of more particularly substantially flat bodies of a ceramic material and continuous furnace for the performance of the process. 4,878,838, Cl. 432-8.000.
Verkaart, Wesley H., to Level 1 Technologies. Heat exchanger for physiological fluids. 4,878,537, Cl. 165-156.000.
Vermeersch, Joan T.; Timmerman, Daniel; Vandenabeele, Hubert; and Vervecken, Jacques L., to AGFA-GEVAERT, N.V. Photographic proteinaceous layers comprising dextran derivatives. 4,879,209, Cl. 430-623.000.
Vermeulen, Jan, to Nicolon B.V. Method for the forming and the deposition in a selected place of a bulk. 4,878,446, Cl. 114-27.000.
Verstringe, Jan B.: *See*—
Van Biesen, Jozef A.; Daes, Guido F.; and Verstringe, Jan B., 4,879,196, Cl. 430-100.000.
Vervecken, Jacques L.: *See*—
Vermeersch, Joan T.; Timmerman, Daniel; Vandenabeele, Hubert; and Vervecken, Jacques L., 4,879,209, Cl. 430-623.000.
Vetter, Kurt: *See*—
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Vicari, John J.; and Suttie, Peter J., to Sundstrand Corporation. Fluid flow self calibration scheme. 4,879,662, Cl. 364-510.000.
Vick, Ralph L., to Allied-Signal Inc. Lightweight hydraulic actuator. 4,878,419, Cl. 92-163.000.
Vicma, S.A.: *See*—
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Victory Equipment (1983) Limited: *See*—
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Vidal, Stephen P. Apparatus and method of creating and controlling an artifical water table. 4,878,780, Cl. 405-38.000.
Vider, Dov-Ami: *See*—
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Vidler, Malcolm E.: *See*—
Cawley, Scott A.; and Vidler, Malcolm E., 4,878,596, Cl. 220-331.000.
Viegas, Herman H., to Thermo King Corporation. Air delivery system for a transport refrigeration unit. 4,878,360, Cl. 62-239.000.
Vieillard, Didier. Method for measuring the coagulation of blood plasma. 4,879,432, Cl. 436-69.000.
Vilums, Ivars J., to LookingGlass Technology, Inc. Optical imaging system using lenticular tone-plate elements. 4,878,735, Cl. 350-131.000.
Vinot, Bernard; and Constant, Odile, to Rhone-Poulenc Chimie. Method and apparatus for mining of ocean floors. 4,878,711, Cl. 299-9.000.
Virdee, Nirmal S.; and Baradaran, Hamid R., to Siemens Transmission Systems, Inc. Jitter tolerant circuit for dual rail data. 4,879,730, Cl. 375-106.000.
Virginia Tech Intellectual Properties, Inc.: *See*—
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Vlasakova, Anna: *See*—
Puschel, Petr; Formanek, Zdenek; Krivanek, Vaclav; Pokorny, Antonin; Vlasakova, Anna; and Stuchikova, Alena, 4,879,246, Cl. 436-145.000.
Voest-Alpine AG: *See*—
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Voest-Alpine Aktiengesellschaft: *See*—
Barnthaler, Franz; and Rutkowski, Krzysztof, 4,878,714, Cl. 299-67.000.
Vogt, Paul A. Eyewear holder. 4,878,641, Cl. 248-309.100.
Voli, Giorgio. Methods for treating gingivitis and paradental pyorrhea. 4,879,106, Cl. 424-54.000.
Vollmann, William: *See*—
Callaghan, Francis J.; and Vollmann, William, 4,878,497, Cl. 128-419.0PG.
Volwerk, Johannes J.: *See*—
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Vook, Dietrich W.: *See*—
Reynolds, Scott K.; Vook, Dietrich W.; and Gibbons, James F., 4,879,259, Cl. 437-247.000.
Vories, Dennis L. Hydrostatic level and elevation measuring device. 4,878,297, Cl. 33-366.000.
Voshell, Glenn R.: *See*—
Manniso, James L.; Sieber, Eugene W.; and Voshell, Glenn R., 4,878,930, Cl. 55-493.000.
W. L. Gore & Associates, Inc.: *See*—
Manniso, James L.; Sieber, Eugene W.; and Voshell, Glenn R., 4,878,930, Cl. 55-493.000.
W. R. Grace & Co.: *See*—
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W. R. Grace & Co.-Conn: *See*—
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W. Schlafhorst & Co.: *See*—
Grecksch, Hans; Bertrams, Josef; and Bucken, Rene, 4,878,629, Cl. 242-18.0PW.
Ruge, Joachim; Kathke, Gregor; and Schlosser, Helmut, 4,879,475, Cl. 307-68.000.
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Wacker-Chemie GmbH: *See*—
Fey, Volker; Pachaly, Bernd; and Zeller, Norbert, 4,879,142, Cl. 427-227.000.
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Wacom Co., Ltd.: *See*—
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Wada, Eizo: *See*—
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Wada, Tomohisa: *See*—
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Wagner, Georg: *See*—
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Wagner, James W.: *See—*
Gilbreath-Frandsen, C.; and Wagner, James W., 4,878,718, Cl. 350-3.690.

Wagner, Maria S.: *See—*
Sinofsky, Edward L.; Spears, J. Richard; Dickinson, Douglas W.; and Wagner, Maria S., 4,878,492, Cl. 128-303.100.

Wagner, Wayner M.; and Flemming, Douglas E., to Donaldson Company, Inc. Apparatus for increasing regenerative filter heating element temperature. 4,878,928, Cl. 55-466.000.

Wainio, Ronald A.: *See—*
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Wajs, Georges: *See—*
Bourset, Claude; and Wajs, Georges, 4,879,072, Cl. 264-1.400.

Wakamatsu, Hidetoshi, to Oki Electric Industry Co., Ltd. Method for fabricating a semiconductor device using a BPSG layer containing high concentrations of phosphorus and boron. 4,879,253, Cl. 437-41.000.

Wakeman, Russell J.: *See—*
Sapienza, Samuel J., IV; van Vuuren, Willem N. J.; Shirey, Benjamin G.; and Wakeman, Russell J., 4,878,461, Cl. 123-90.150.

Wakihira, Koichiro; Katsuta, Michitaka; Hino, Masayasu; and Sasayama, Toshio, to Kabushiki Kaisha Kobe Seiko Sho. Drill for drilling a thin plate. 4,878,788, Cl. 408-230.000.

Wako Pure Chemical Industries, Ltd.: *See—*
Sakata, Yoshitsugu; Hashidume, Kazunari; Iwata, Tsutomu; Mukai, Toyoharu; and Kida, Masaaki, 4,879,383, Cl. 544-37.000.
Tokuda, Kuniaki; Morii, Seiji; and Yamanishi, Kazuhiko, 4,879,221, Cl. 435-15.000.

Waku, Yoshiharu; Yoshioka, Hideho; Oba, Hiroyoshi; and Fujino, Kiyoshi, to Ube Industries, Ltd. Method for coating soot on a melt contact surface. 4,879,074, Cl. 264-24.000.

Wakunaga Seiyaku Kabushiki Kaisha: *See—*
Miyazawa, Tatsuo; Yokoyama, Shigeyuki; and Miyake, Tetsuo, 4,879,223, Cl. 435-68.000.

Wakusaka, Kazuharu: *See—*
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Walbro Corporation: *See—*
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Tuckey, Charles H., 4,878,816, Cl. 417-76.000.

Waldhelm, Christian M.: *See—*
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Walker, William B.: *See—*
Ikeda, George; and Walker, William B., 4,878,322, Cl. 52-2.000.

Walker, William R., to Hydro-Craft, Inc. Hexagonal junction adapter for clamping system. 4,878,696, Cl. 285-61.000.

Wall, Stephen W., to Hughes Aircraft Company. Fiber optic attenuator. 4,878,730, Cl. 350-96.210.

Wallace, Robert B.; and Itoh, Hiratake, to Asahi Kasei Kogyo Kabushiki Kaisha. Novel human physiologically active polypeptide. 4,879,226, Cl. 435-68.000.

Wallner, Barbara P.; Pepinsky, R. Blake; and Garwin, Jeffrey L., to Biogen, Inc. DNA sequences, recombinant DNA molecules and processes for producing human phospholipase inhibitor polypeptides. 4,879,224, Cl. 435-68.000.

Wallroth, Carl-Friedrich: *See—*
Loughlin, Patrick J.; Westenskow, Dwayne R.; Wied, Henrich A.; and Wallroth, Carl-Friedrich, 4,878,388, Cl. 73-866.400.

Walt Disney Company, The: *See—*
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Walter, James M.; Jonnalagadda, Krishnamurthy; and Flory, Robert E., to General Electric Company. EDTV recording apparatus. 4,879,606, Cl. 358-330.000.

Walter, Richard K., to Laser Communications, Inc. Apparatus and method for alignment of fixed communication laser stations. 4,879,764, Cl. 455-607.000.

Wanderer, Alan A.; and Sagstetter, William E. Needle guard for body substance isolation. 4,878,902, Cl. 604-192.000.

Wands, Jack R.; Zurawski, Vincent R., Jr.; and Schoemaker, Hubert J. P., to General Hospital Corporation. Immunoassay utilizing monoclonal high affinity IgM antibodies. 4,879,219, Cl. 435-7.000.

Wang, Chang Y.; and Wang, James J. G., to United Biomedical Inc. Rapid immunoagglutination test for presence of HIV in body fluids. 4,879,211, Cl. 435-5.000.

Wang, Chang Y.; and Wang, James J. G., to United Biomedical Inc. Peptide composition and method for the detection of antibodies to HTLV-III. 4,879,212, Cl. 435-5.000.

Wang, Fun-Den. Hydraulic method of mining coal. 4,878,712, Cl. 299-10.000.

Wang, James J. G.: *See—*
Wang, Chang Y.; and Wang, James J. G., 4,879,211, Cl. 435-5.000.
Wang, Chang Y.; and Wang, James J. G., 4,879,212, Cl. 435-5.000.

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Wangner Systems Corporation: *See—*
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Warawa, Edward J.; and Migler, Bernard M., to ICI Americas Inc. Novel dibenzothiazepine antipsychotic. 4,879,288, Cl. 514-211.000.

Ward, John W., to Union Oil Company of California. Hydrocarbon conversion process for selectively making middle distillates. 4,879,019, Cl. 208-111.000.

Ward Machinery Company, The: *See—*
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Ward, William F., Jr.: *See—*
Harrison, John R.; Lehr, Gary L.; Parr, Dennis J.; Ward, William F., Jr.; and Wells, Robert R., 4,878,407, Cl. 83-13.000.

Warkentin, Paul A.; Rieger, Michael L.; Michalski, Chris A.; and Jolley, Matthew J., to ATEQ Corporation. Rasterization system utilizing an overlay of bit-mapped low address resolution databases. 4,879,605, Cl. 358-296.000.

Warner-Lambert Company: *See—*
Mahjour, Majid; Mauser, Bernadette E.; and Fawzi, Mahdi B., 4,879,297, Cl. 514-282.000.
Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., 4,879,108, Cl. 424-440.000.

Warner, Robert W.: *See—*
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Warren, John H.: *See—*
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Warywoda, Joseph: *See—*
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Washchynsky, Bohdan; and Fisher, Vladimir J., to Webtron Corporation. Printing station with toolless changeable plate cylinder. 4,878,427, Cl. 101-219.000.

Washington, Derek: *See—*
Knapp, Alan G.; Lamport, Daphne L.; Washington, Derek; and Woodhead, Alfred W., 4,879,496, Cl. 315-366.000.

Wason, Satish K., to J. M. Huber Corporation. Detergent compositions comprising synthetic alkali metal aluminosilicates. 4,879,058, Cl. 252-174.250.

Wason, Satish K., to J. M. Huber Corporation. Synthetic alkali metal alumino-silicates, methods and uses, compositions and their methods of preparation. 4,879,323, Cl. 523-351.000.

Watanabe, Hiroko: *See—*
Moriguchi, Soyao; Suzuki, Hiroshi; Watanabe, Hiroko; Satoh, Motoaki; Abe, Michio; and Iwata, Yasuo, 4,879,340, Cl. 525-54.200.

Watanabe, Kiminori: *See—*
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Watanabe, Masayuki: *See—*
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Watanabe, Mikio: *See—*
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Watanabe, Noboru: *See—*
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Watanabe, Okosu: *See—*
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Watanabe, Yasuo: *See—*
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Watanabe, Yasuyuki: *See—*
Ohkubo, Yukitoshi; Watanabe, Yasuyuki; Mochizuki, Chiori; Ishii, Takayuki; Yamanobe, Masato; and Ishiwata, Kazuya, 4,878,742, Cl. 350-347.00V.

Watanabe, Yoshihiko: *See—*
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Watanabe, Yoshio: *See—*
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Watarai, Shinichi, to Fujitsu Limited. Control method of transporting a cut sheet in a printing station and an apparatus using the same. 4,878,428, Cl. 101-484.000.

Watari, Mitsuru: *See—*
Kaneko, Katsutoshi; Kobayashi, Toshio; and Watari, Mitsuru, 4,878,972, Cl. 156-78.000.

Waterhouse, Paul I.: *See—*
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Watkins, Donald M.; Huggett, Tryon V.; and Martt, Judson F., to Steel Equipment Specialists, Inc. Ladle transfer car with weighing system. 4,878,551, Cl. 177-139.000.

Watkins, James D.; Andreas, David W.; and Cox, David H., to Golden Valley Microwave Foods, Inc. Flexible packaging sheets and packages formed therefrom. 4,878,765, Cl. 383-116.000.

Watson, James E.; and Davies, Theodore E., to Gas Research Institute. Radiant tube fired with two bidirectional burners. 4,878,480, Cl. 126-91.00A.

Waynick, John A., to Amoco Corporation. Process for producing low temperature high performance grease. 4,879,054, Cl. 252-41.000.

Wear, Boyd A.; Latham, Craig V.; and Priser, James A. Vaporization apparatus and method for producing curing gas. 4,878,533, Cl. 164-16.000.

Weatherup, Clifford R., to English Electric Valve Company Limited. Gas discharge devices wherein electrons are injected into a high field region. 4,879,490, Cl. 313-601.000.

Webb, David M.: *See*—
Kendall, Jerry A.; and Webb, David M., 4,878,861, Cl. 439-751.000.

Webb, Roderick P., to British Telecommunications, plc. Bistable optically clocked optical signal regenerator. 4,879,761, Cl. 455-601.000.

Weber, Markus; Ryser, Andreas; and Jeker, Rene, to Spectrospin AG. Cryostat. 4,878,351, Cl. 62-51.100.

Weber, Markus; Ryser, Andreas; and Jeker, Rene , to Spectrospin AG. Cryostat and assembly method therefor. 4,878,352, Cl. 62-51.100.

Weber, Ronald G.: *See*—
Lowrance, Darrell J.; and Weber, Ronald G., 4,879,697, Cl. 367-111.000.

Webster, Charles; and John, Christian J., to American National Can Company. Linerless cap closure. 4,878,589, Cl. 215-252.000.

Webtron Corporation: *See*—
Washchynsky, Bohdan; and Fisher, Vladimir J., 4,878,427, Cl. 101-219.000.

Wedel, Gregory L., to Beloit Corporation. Insulating apparatus for thermally insulating a dryer head. 4,878,299, Cl. 34-35.000.

Wehr, Rudolf, to BASF Aktiengesellschaft. Polycaprolactam with titanium dioxide content. 4,879,120, Cl. 524-430.000.

Wehrle, Matthew E.: *See*—
Connelly, Bruce A.; Wehrle, Matthew E.; and Greigger, Paul P., 4,879,345, Cl. 525-104.000.

Wei, Ru-Dong: *See*—
Chu, Fun S.; Wei, Ru-Dong; and Zhang, Guang S., 4,879,248, Cl. 436-543.000.

Weible, Warren W.: *See*—
Simpson, Steven C.; and Weible, Warren W., 4,878,406, Cl. 81-436.000.

Weidenhaupt, Wolfgang; Wepner, Gunther; Dismon, Peter; and Remijn, Mattheus G., to AKZO BM Arnhem, The Netherlands. Reinforcing rope made of at least two different materials. 4,878,343, Cl. 57-222.000.

Weigel, Janet H.: *See*—
Boughton, John H.; Butz, Ralph A.; Cheng, Herman C. T.; Dennis, Jonathan R.; Hannon, Brian T.; and Weigel, Janet H., 4,879,043, Cl. 210-651.000.

Weigelt, Peter. Foot-actuated powder dispenser. 4,878,602, Cl. 222-161.000.

Weimann, Wendelin, to Georg Fischer AG. Apparatus for the compacting of granular molding materials. 4,878,534, Cl. 164-154.000.

Wells, David L., to Stewart & Stevenson Services, Inc. Vehicle steering systems. 4,878,556, Cl. 180-140.000.

Wells, Francis E., Sr.; and Spector, George. Super kooler. 4,878,363, Cl. 62-400.000.

Wells, James I.: *See*—
Davison, Edward; and Wells, James I., 4,879,303, Cl. 514-356.000.

Wells, Robert R.: *See*—
Harrison, John R.; Lehr, Gary L.; Parr, Dennis J.; Ward, William F., Jr.; and Wells, Robert R., 4,878,407, Cl. 83-13.000.

Welschof, Hans-Heinrich; and Schwarzler, Peter, to Lohr & Bromkamp GmbH. Cross groove constant velocity ratio universal joints. 4,878,882, Cl. 464-144.000.

Wen, Horng-Yuan: *See*—
Kasper, Gerhard; Wen, Horng-Yuan; and Nishikawa, Yukinobu, 4,878,510, Cl. 137-1.000.

Wendt, Michael L. Apparatus for thermoforming plastic materials. 4,878,826, Cl. 425-384.000.

Weng, Litai; Calderhead, David; Khanna, Pyare; and Ullman, Edwin F., to Syntex (U.S.A.) Inc. Concentrating immunochemical test strip. 4,879,215, Cl. 435-7.000.

Wenzel, Wolfgang D.: *See*—
Markusch, Peter H.; Mason, Arthur W.; and Wenzel, Wolfgang D., 4,879,322, Cl. 523-322.000.

Wepner, Gunther: *See*—
Weidenhaupt, Wolfgang; Wepner, Gunther; Dismon, Peter; and Remijn, Mattheus G., 4,878,343, Cl. 57-222.000.

Werner Turck GmbH & Co., KG: *See*—
Tigges, Burkhard; and Brasse, Dierk, 4,879,531, Cl. 331-65.000.

Wertz, Timothy A.: *See*—
Saltzman, Gilbert A.; Wertz, Timothy A.; and Friedman, Ira L., 4,878,953, Cl. 148-4.000.

West, Philip B.; Major, Robert D.; and Fuerstenberg, Gary D., to Hoover Group, Aluminum Products Division. Metal trim attaching system. 4,878,273, Cl. 24-289.000.

Westenskow, Dwayne R.: *See*—
Loughlin, Patrick J.; Westenskow, Dwayne R.; Wied, Henrich A.; and Wallroth, Carl-Friedrich, 4,878,388, Cl. 73-866.400.

Westerkamp, Myron M. Rope tie-down apparatus. 4,878,270, Cl. 24-132.00R.

Western Atlas International, Inc.: *See*—
Dumestre, Alex C., II, 4,879,719, Cl. 367-20.000.

Westinghouse Electric Corp.: *See*—
Evans, David H., 4,878,810, Cl. 416-203.000.
Fridsma, Daniel E., 4,878,348, Cl. 60-660.000.
Tempco, Dale A., 4,878,639, Cl. 248-73.000.

Westphal, Klaus, to Carl-Zeiss-Stiftung. Tube for a microscope. 4,878,757, Cl. 356-432.000.

Westvaco Corporation: *See*—
Force, Carlton G., 4,879,369, Cl. 530-205.000.
Gowan, John W., Jr., 4,878,999, Cl. 162-164.600.

Wetch, Terry L. Tire recapping curing jacket. 4,878,822, Cl. 425-14.000.

Wheeler, Gerald L.: *See*—
Mabrouk, Saied A.; and Wheeler, Gerald L., 4,879,577, Cl. 355-208.000.

Wheless, Thomas K. Continuously variable chain drive transmission. 4,878,883, Cl. 474-51.000.

Whiddon, Wade Q. Stick delivery apparatus. 4,878,803, Cl. 414-789.500.

Whitehead, Martin A., to U.S. Philips Corporation. Liquid chromatograph apparatus. 4,879,029, Cl. 210-198.200.

Whitehead, Stanley A. Automatic portable sharpening kit for electric cattle shearers/clippers. 4,878,321, Cl. 51-358.000.

Whitehead, Thomas P.; Thorpe, Gary H. G. H.; Kricka, Larry J.; Gibbons, John E. C.; and Bunce, Roger A. Dispensing device and recording apparatus. 4,879,097, Cl. 422-67.000.

Whiteman, Marvin E., Jr. Riding power trowel. 4,878,779, Cl. 404-112.000.

Whitemetal, Inc.: *See*—
Woodson, Jerry P., 4,878,320, Cl. 51-320.000.

Whitham, Kent G., to United States of America, Navy. Expanding ring joint. 4,878,695, Cl. 285-39.000.

Whittle, Joanne R.: *See*—
Matthews, Leonard A.; Powers, William J., III; Przybyla, Henry M.; Whittle, Joanne R.; and Perciful, Jerry C., 4,879,053, Cl. 252-25.000.

Wiebus, Ernst: *See*—
Bach, Hanswilhelm; Bahrmann, Helmut; Cornils, Boy; Gick, Wilhelm; Heim, Volker; Konkol, Werner; and Wiebus, Ernst, 4,879,418, Cl. 568-454.000.

Wied, Henrich A.: *See*—
Loughlin, Patrick J.; Westenskow, Dwayne R.; Wied, Henrich A.; and Wallroth, Carl-Friedrich, 4,878,388, Cl. 73-866.400.

Wiegand, Walter J., Jr.; and Bullis, Robert H., to United Technologies Corporation. Optical fluid level sensor. 4,878,383, Cl. 73-293.000.

Wiener & Co. Apparatenbouw B.V.: *See*—
Tadema, Jan C., 4,878,426, Cl. 99-485.000.

Wiesner, Dieter: *See*—
Mitzkus, Jurgen; and Wiesner, Dieter, 4,878,689, Cl. 280-731.000.

Wildenauer, Anton. Airfoil for a wind-driven wheel. 4,878,808, Cl. 416-132.00B.

Wilfred Pavel Maschinenbau: *See*—
Kohler, Donald, 4,878,336, Cl. 53-500.000.

Wilhelm, Wilhelm; and Birth, Winfried, to Siemens Aktiengesellschaft. Monolithically integratable phase shifter VCO. 4,879,530, Cl. 331-45.000.

Wilkins, Tracy D.; and Lyerly, David M., to Virginia Tech Intellectual Properties, Inc. Antibody for *C.difficile*. 4,879,218, Cl. 435-7.000.

Willard, Miles J.; Arnold, Jane J.; and Hix, Veldon M. Method for preventing distortion in the shape of fried strand-like expanded snacks. 4,879,126, Cl. 426-272.000.

Willer, Rodney L.; Cunkle, Glen T.; and Klein, Nathan, to Morton Thiokol, Inc. Oxidizing salts of cubyl amines. 4,878,968, Cl. 149-45.000.

Williams, Jack L., to ITT Corporation. Clutch apparatus. 4,878,880, Cl. 464-37.000.

Wilmes, Manfred: *See*—
Haller, Bernd; Herkner, Ernst; Murray, Peter; Riesenberg, Volker; Schnatwinkel, Michael; Schulze, Rainer; Wagner, Georg; and Wilmes, Manfred, 4,878,859, Cl. 439-716.000.

Wilson, Geoffrey; and Hemingway, Trevor, to Dave McKee (SHeffield) Limited. Peel assembly for an ingot manipulator. 4,878,373, Cl. 72-420.000.

Wilson, William E.: *See*—
Latassa, Frank M.; and Wilson, William E., 4,879,492, Cl. 313-487.000.

Winchester, Charles D., to Ryobi Motor Products Corp. Lock-on/lock-off switch for power tool. 4,879,438, Cl. 200-61.850.

Windmoller & Holscher: *See*—
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Winkel, Jens: *See*—
Reiners, Jurgen; Podszun, Wolfgang; Winkel, Jens; Suling, Carlhans; and Klein, Gerhard, 4,879,402, Cl. 560-26.000.

Winter, Joseph; and Pryor, Michael J., to Olin Corporation. Optical fiber communication cable having a high strength, drawn copper alloy tube. 4,878,733, Cl. 350-96.230.

Wisconsin Alumni Research Foundation: *See*—
Belzer, Folkert D.; and Southard, James H., 4,879,283, Cl. 514-60.000.
Chu, Fun S.; Wei, Ru-Dong; and Zhang, Guang S., 4,879,248, Cl. 436-543.000.
Handelsman, Jo E.; and Halverson, Larry J., 4,878,936, Cl. 71-7.000.

Wise, James H., to AMP Incorporated. Connector for mating two bus bars. 4,878,862, Cl. 439-787.000.

Wise, James H.: *See*—
Swengel Jr., Robert C.; and Wise, James H., 4,878,863, Cl. 439-884.000.

Wise, Marcus B.; and Buchanan, Michelle V., to United States of America, Energy. Multiplexed electronically programmable multimode ionization detector for chromatography. 4,879,472, Cl. 250-379.000.

Wissman, Charles H.: *See*—
Braski, Michael T.; Wissman, Charles H.; Tilton, Richard A.; and Robusto, Paul F., 4,879,721, Cl. 372-18.000.

Witerski, Glenn S.: *See*—
Folger, Edward C.; and Witerski, Glenn S., 4,879,448, Cl. 219-121.630.

Woiceshyn, D. Mark, to Bay Mills Limited. Textiles containing interstices and processes for making such textiles. 4,879,163, Cl. 428-198.000.

Wojnarowski. Robert J.: *See*—
Eichelberger, Charles W.; and Wojnarowski, Robert J., 4,878,991, Cl. 156-630.000.

Wolfe, Henry S., to Frenry Company, The. Inflatable bulbous toy having a substantially non-bulbous center section. 4,878,661, Cl. 272-52.000.

Wolfe, Jack, to Ryobi Motor Products Corp. Collet lock for power tool. 4,878,405, Cl. 81-57.310.

Wollschlager, Dieter; and Scharrenbroich, Helmut, to Battenfeld Fischer Blasformtechnik GmbH. Closing device for manufacturing articles of thermoplastic material. 4,878,828, Cl. 425-541.000.

Wong, Carol W.: *See*—
Nelson, Leonard Y.; Green, John R.; and Wong, Carol W., 4,878,722, Cl. 350-96.200.

Wong, Chi W., to Process Automation Int'l Ltd. Shield for plating bath. 4,879,007, Cl. 204-15.000.

Wong, Gordon G.: *See*—
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Wong, Wayman: *See*—
Liu, Yuan K.; Kuhmichel, Philip A.; Cordes, Fred G.; and Wong, Wayman, 4,879,127, Cl. 426-325.000.

Woo, James T. K.; Reising, John C.; Marcinko, Richard M.; and Miles, David E., to Glidden Company, The. Acrylic/silicone resins for powder coatings. 4,879,344, Cl. 525-100.000.

Wood-Rethwill, Julianne C.; Jaworski, Robert J.; Myers, E. Gary; and Marshall, Michael L., to Dial Corporation, The. Process for making translucent soap bars. 4,879,063, Cl. 252-370.000.

Wood, Thomas H., to American Telephone and Telegraph Company, AT&T Bell laboratories. Optical fiber bidirectional transmission system. 4,879,763, Cl. 455-607.000.

Woodhead, Alfred W.: *See*—
Knapp, Alan G.; Lamport, Daphne L.; Washington, Derek; and Woodhead, Alfred W., 4,879,496, Cl. 315-366.000.

Woodhouse, Clive S.: *See*—
Morgan, Alton C., Jr.; Woodhouse, Clive S.; and McIntyre, Robert F., 4,879,225, Cl. 435-68.000.

Woodrow, Michael; and Lacey, Raymond D., to Avdel Systems Limited. Bush having a radially enlarged flange. 4,878,795, Cl. 411-501.000.

Woodson, Jerry P., to Whitemetal, Inc. Abrasive feed system. 4,878,320, Cl. 51-320.000.

Woolsey, Maron E.: *See*—
Sublette, Kerry L.; Woolsey, Maron E.; Manning, Francis S.; Montgomery, Anne D.; and McInerney, Michael J., 4,879,240, Cl. 435-252.100.

Wordin, John J., to United States of America, Energy. Plug valve. 4,878,652, Cl. 251-181.000.

Worldwide Oilfield Machine, Inc.: *See*—
Meyer, Frank W., Jr., 4,878,651, Cl. 251-172.000.

Wormmeester, Gerhardus J., to Europe Container Terminus B.V. Positioning appliance. 4,878,587, Cl. 212-271.000.

Wraight, Peter D.; Marienbach, Edouard; Hache, Jean-Michel; Rhein-Knudsen, Erik; and Evans, Mike, to Schlumberger Technology Corporation. Method and apparatus for subsurface formation evaluation. 4,879,463, Cl. 250-270.000.

Wreede, John E.; Scott, James E.; and Upper, Richard B., to Hughes Aircraft Company. Automotive wheel covers with spatially stabilized images. 4,878,719, Cl. 350-3.750.

Wright, Diane G.: *See*—
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Wright Line, Inc.: *See*—
Paquette, Edmund T.; and Beam, John W., 4,878,583, Cl. 211-41.000.

Wronski, Yurek A., to Cotswold Architectural Products Limited. Latch mechanisms. 4,878,699, Cl. 292-143.000.

WS Warmeprozesstechnik GmbH: *See*—
Wunning, Joachim, 4,878,839, Cl. 432-72.000.

Wu, Cheng-Teh: *See*—
Masud, Charles R.; and Wu, Cheng-Teh, 4,878,290, Cl. 29-603.000.

Wunning, Joachim, to WS Warmeprozesstechnik GmbH. Non-polluting hot gas generating system. 4,878,839, Cl. 432-72.000.

Wurthner, Hubert: *See*—
Stritzl, Karl; Luschnig, Franz; Riegler, Andreas; Wurthner, Hubert; and Freisinger, Henry, 4,878,687, Cl. 280-605.000.

X-Ray Industries, Inc.: *See*—
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XCP, Inc.: *See*—
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Xerox Corporation: *See*—
Campanelli, Michael R., 4,878,992, Cl. 156-633.000.
Gruber, Robert J.; Yourd, Raymond A., III; Julien, Paul C.; Knapp, John F.; and Bolte, Steven B., 4,879,199, Cl. 430-137.000.
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Yabumoto, Junsuke: *See*—
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Yabuta, Katsuhisa: *See*—
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Yabuuchi, Takahiro: *See*—
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Yabuzuka, Masao: *See*—
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Yada, Isao: *See*—
Hisajima, Masahiko; Kimura, Hiroshi; Shigemura, Yutaka; Yada, Isao; Irie, Yoichiro; Morimoto, Kiyoshi; and Nagashima, Takashi, 4,879,578, Cl. 355-234.000.

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Yamada, Akira: *See*—
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Yamada, Jun: *See*—
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Yamada, Kimitoshi: *See*—
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Yamada, Koichi: *See*—
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Shionozaki, Yoshio; Mukai, Hiroshi; Obikawa, Tsuyoshi; and Yamada, Shuhei, 4,879,060, Cl. 252-299.610.

Yamada, Suzuya: *See*—
Mori, Yoshiharu; Yamada, Suzuya; Saito, Mitsuaki; Hagiwara, Hirotoshi; and Ehara, Kenichi, 4,878,866, Cl. 445-36.000.

Yamada, Takeshi; Osato, Yasukuni; Watanabe, Okosu; Suzuki, Masao; Kawata, Osamu; and Ishihara, Koushi, to Fujikura Ltd.; and Nippon Telegraph & Telephone Public Corporation. Apparatus for fusion splicing optical fibers. 4,878,933, Cl. 65-29.000.

Yamade, Kenichi; Nakashima, Sukeyoshi; Inaba, Shigemitsu; and Ohtaka, Kazuto, to Yazaki Corporation. Locking device for connector assembly. 4,878,853, Cl. 439-144.000.

Yamagishi, Hirofumi; Segoshi, Tooru; Shigemura, Kouji; Nakata, Yutaka; Yoneyama, Hirokazu; and Yamashita, Mototsugu, deceased (by Yamashita, Takemi, heir), to Nissan Motor Company; and Ichikoh Industries. Projector-type head lamp for vehicles. 4,879,636, Cl. 362-61.000.

Yamaguchi, Hidehiko; Minami, Kouichi; and Kobayashi, Nobuo, to Tomy Kogyo Co., Inc. Doll toy. 4,878,873, Cl. 446-321.000.

Yamaguchi, Hisayoshi; Yanagisawa, Tamotsu; Yabuzuka, Masao; Shimizu, Masakatu; and Tanaka, Takashi, to Shin-Etsu-Handota, Co., Ltd. Method for fire extinguishment of chlorosilanes. 4,879,050, Cl. 252-2.000.

Yamaguchi, Masahiro: *See*—
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Yamaguchi, Toshio: *See*—
Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, 4,878,814, Cl. 417-63.000.

Yamaguchi, Yasuhiro; Shimoyama, Yuji; Ohnishi, Tateo; and Ohno, Hironobu, to Kawasaki Steel Corp. Method and system for controlling tension to be exerted on metal strip in continuous annealing furnace. 4,878,961, Cl. 148-128.000.

Yamaguchi, Yoshihiro; Watanabe, Kiminori; Nakagawa, Akio; Furukama, Kazuyoshi; Fukuda, Kiyoshi; and Tanzawa, Katsujiro, to Kabushiki Kaisha Toshiba. Dielectrically isolated semiconductor substrate. 4,878,957, Cl. 148-33.300.

Yamaha Corporation: *See*—
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Yamashita, Toshinori, 4,878,414, Cl. 84-421.000.

Yamaha Hatsudoki Kabushiki Kaisha: *See*—
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Yamaki, Kaoru: *See*—
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Yamamoto, Hachizou: *See*—
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Yamamoto, Haruhiko; Suzuki, Masahiro; Udagawa, Yoshiaki, Nakata, Mitsuhiko; Katsuyama, Koji; Ono, Izumi; and Kikuchi, Shunichi, to Fujitsu Limited. Cooling system for an electronic circuit device. 4,879,632, Cl. 361-386.000.

Yamamoto, Hirokazu: *See*—
Kohmura, Isao; Senga, Takao; Furukawa, Akira; Yamamoto, Hirokazu; Nakatani, Mamoru; and Yamada, Jun, 4,879,197, Cl. 430-119.000.

Yamamoto, Hiroyuki: *See*—
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Yamamoto, Takemi; and Sakakibara, Kenji, to Brother Kogyo Kabushiki Kaisha. Image recording apparatus. 4,879,579, Cl. 355-235.000.

Yamamoto, Yujiro. Illumination control methods and means. 4,879,495, Cl. 315-362.000.

Yamamoto, Yukio: *See*—
Kawano, Hitoshi; Hayashi, Mitsuhiro; Yamamoto, Yukio; and Ban, Kunikatsu, 4,879,445, Cl. 219-64.000.

Yamanami, Tsuguya; Funahashi, Takahiko; and Senda, Toshiaki, to Wacom Co., Ltd. Position detecting apparatus. 4,878,553, Cl. 178-18.000.

Yamane, Yuji; and Nishikawa, Hideya, to Tomy Kogyo Co., Inc. Toys having magnetic switches. 4,878,869, Cl. 446-130.000.

Yamanishi, Kazuhiko: *See*—
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Yamanouchi Pharmaceutical Co., Ltd.: *See*—
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Senuma, Makoto; Kondoh, Shigeru; Kawase, Tadamasa; and Nakagawa, Yoshihiko, 4,879,118, Cl. 424-448.000.

Yamaoka, Masami: *See*—
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Yamashita, Akihiko, to Alps Electric Co., Ltd. Magnetic head for flexible disk drive. 4,879,620, Cl. 360-123.000.

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Yamashita, Takemi, heir: *See*—
Yamagishi, Hirofumi; Segoshi, Tooru; Shigemura, Kouji; Nakata, Yutaka; Yoneyama, Hirokazu; and Yamashita, Mototsugu, deceased, 4,879,636, Cl. 362-61.000.

Yamashita, Tatsuo: *See*—
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Yamashita, Toshinori, to Yamaha Corporation. Musical instrument stand. 4,878,414, Cl. 84-421.000.

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Miwa, Hideo; Tsuruoka, Kazuhiro; Yamauchi, Koudou; Endoh, Hitoshi; and Odaka, Masanori, 4,879,681, Cl. 365-189.010.

Yamazaki, Mitsumasa: *See*—
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Yang, Ming-he: *See*—
Chen, Yen-rong; Yang, Ming-he; Huang, Liang; Liu, Geng-tao; and Benz, Ulrich, 4,879,390, Cl. 548-453.000.

Yang, Robert K.; Sharma, Shri C.; Sheu, Shan-Shan; and Shaw, James J., to Warner-Lambert Company. Confectionery delivery system for antipyretics. 4,879,108, Cl. 424-440.000.

Yano, Hisashi; Ihara, Hiroyuki; and Yabumoto, Junsuke, to Mitsubishi Oil Co., Ltd. Integrated separator for solid and gas contaminants in engine oil. 4,878,924, Cl. 55-204.000.

Yano, Keiji: *See*—
Takagi, Masamichi; Yano, Keiji; Shibuya, Ichiro; and Morikawa, Minoru, 4,879,230, Cl. 435-172.300.

Yap, Mary S.: *See*—
Aune, Jan E.; Arden, Terence J.; and Yap, Mary S., 4,879,752, Cl. 382-1.000.

Yasuda, Makoto: *See*—
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Yasunaga, Osamu; Wakusaka, Kazuharu; Inomata, Fumio; and Tsuchiya, Toshio, to Honad Giken Kogyo Kabushiki Kaisha. Air intake device for a vehicle engine. 4,878,555, Cl. 180-68.300.

Yates, John B., III: *See*—
Bopp, Richard C.; and Yates, John B., III, 4,879,346, Cl. 525-146.000.

Yazaki Corporation: *See*—
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Muramatsu, Masahiro, 4,878,387, Cl. 73-866.300.
Takashima, Makoto; Aoki, Yoshihito; and Oikawa, Takahiro, 4,879,658, Cl. 364-449.000.
Yamade, Kenichi; Nakashima, Sukeyoshi; Inaba, Shigemitsu; and Ohtaka, Kazuto, 4,878,853, Cl. 439-144.000.

Yazawa, Akira, to NEC Corporation. Watchdog timer circuit suited for use in microcomputer. 4,879,647, Cl. 364-200.000.

Yeh, James T.; Ekmann, James M.; Pennline, Henry W.; and Drummond, Charles J., to United States of America, Energy. Nox control for high nitric oxide concentration flows through combustion-driven reduction. 4,878,442, Cl. 110-345.000.

Yein, Frederick S.: *See*—
Baldwin, Thomas O.; Holzman, Thomas F.; Satoh, Paul S.; and Yein, Frederick S., 4,879,249, Cl. 436-543.000.

Yoda, Hiroaki: *See*—
Kurokawa, Hideaki; Yamada, Akira; Koseki, Yasuo; Matsuzaki, Harumi; Ebara, Katsuya; Takahashi, Sankichi; Yoda, Hiroaki; Hayashi, Nobuatsu; Okouchi, Isao; Hishinuma, Yukio; and Momma, Naohiro, 4,879,041, Cl. 210-640.000.

Yoguchi, Katsuji: *See*—
Iwasaki, Kozo; Kuragano, Morimasa; Koshibe, Minoru; Sezaki, Yoshihiro; Yoguchi, Katsuji; and Koyama, Yoshio, 4,879,412, Cl. 562-600.000.

Yokogawa, Fumihiko: *See*—
Aoyagi, Yoshio; Hirano, Hiroyuki; Kimura, Toshiyuki; Niinuma, Susumu; Yoshioka, Minoru; Haeno, Akira; Sato, Takashi; Nishi, Yoshiro; Watanabe, Yoshihiko; Yokogawa, Fumihiko; Matsumoto, Keiichi; and Ogawa, Youichi, 4,879,705, Cl. 369-32.000.

Yokoyama, Kazuo: *See*—
Takaya, Yoshikazu; and Yokoyama, Kazuo, 4,879,193, Cl. 430-14.000.

Yokoyama, Shigeki: *See*—
Sano, Akira; Kobayashi, Seizo; Matsuura, Kazuo; Yokoyama, Shigeki; and Kamiya, Takeshi, 4,879,076, Cl. 264-28.000.

Yokoyama, Shigeyuki: *See*—
Miyazawa, Tatsuo; Yokoyama, Shigeyuki; and Miyake, Tetsuo, 4,879,223, Cl. 435-68.000.

Yoneyama, Hirokazu: *See*—
Yamagishi, Hirofumi; Segoshi, Tooru; Shigemura, Kouji; Nakata, Yutaka; Yoneyama, Hirokazu; and Yamashita, Mototsugu, deceased, 4,879,636, Cl. 362-61.000.

Yorozu, Hidenori, to Kao Corporation. Weakly acidic bath agents. 4,879,105, Cl. 424-44.000.

Yoshida, Akimaro: *See*—
Honjo, Takeshi; and Yoshida, Akimaro, 4,878,656, Cl. 270-53.000.

Yoshida, Kazuhiro; and Takamuki, Yasuhiko, to Konica Corporation. Safelight for silver halide light-sensitive photographic material. 4,879,207, Cl. 430-564.000.

Yoshida Kogyo K. K.: *See*—
Kazui, Hidetaka; and Takano, Tomiyoshi, 4,878,275, Cl. 24-436.000.

Yoshida, Tadahiro: *See*—
Kikukawa, Yoshiiku; Nakasa, Masayuki; Yoshida, Tadahiro; Kitaura, Mashio; Nakai, Masaaki; Omaki, Takanobu; and Taniguchi, Nobuyuki, 4,878,751, Cl. 354-410.000.

Yoshiki, Naokazu: *See*—
Masuda, Yasuo; Takahashi, Tsutomu; Takizawa, Yoshio; and Yoshiki, Naokazu, 4,879,185, Cl. 428-687.000.

Yoshimura, Masayoshi: *See*—
Suzuki, Yukio; Masuda, Ikuro; Iwamura, Masahiro; Kadono, Shinji; Uragami, Akiro; Yoshimura, Masayoshi; and Matsubara, Toshiaki, 4,879,480, Cl. 307-446.000.

Yoshinaga, Junji; Shoyaki, Takeshi; Kakita, Takao; Ozeki, Hiromi; Sugimoto, Nobuko; and Kato, Yoshiko, to Sawai Pharmaceutical Co., Ltd. N-tetrazolyl thiazolecarboxyamide derivatives and their use. 4,879,295, Cl. 514-255.000.

Yoshino, Masachika; Hasebe, Nobuyuki; Fujiki, Hironao; and Inomata, Hiroshi, to Shin-Etsu Chemical Co., Ltd. Storage stable and room temperature-curable organopolysiloxane composition. 4,879,339, Cl. 524-740.000.

Yoshioka, Hideho: *See*—
Waku, Yoshiharu; Yoshioka, Hideho; Oba, Hiroyoshi; and Fujino, Kiyoshi, 4,879,074, Cl. 264-24.000.

Yoshioka, Mashayuki. Implement for disposing of dung of a pet animal. 4,878,703, Cl. 294-1.500.

Yoshioka, Minoru: *See*—
Aoyagi, Yoshio; Hirano, Hiroyuki; Kimura, Toshiyuki; Niinuma, Susumu; Yoshioka, Minoru; Haeno, Akira; Sato, Takashi; Nishi, Yoshiro; Watanabe, Yoshihiko; Yokogawa, Fumihiko; Matsumoto, Keiichi; and Ogawa, Youichi, 4,879,705, Cl. 369-32.000.

Younes, Usama E., to Arco Chemical Technology, Inc. Laminated composite of a rigid polyisocyanurate substrate and metal, plastic, cellulose, glass, ceramic or combinations thereof. 4,879,164, Cl. 428-209.000.

Young, Elbert J. Article holder and selector. 4,878,584, Cl. 211-59.100.

Young, John A.: *See*—
Cordova, David S.; Rowan, Hugh H.; and Young, John A., 4,879,179, Cl. 428-361.000.

Young, Robert F.; and Kraz, Vladimir, to Plantronics, Inc. Voice communication link interface apparatus. 4,879,746, Cl. 379-399.000.

Young, Ronald A., to Scot Young Service Systems Limited. Cleaning equipment. 4,878,264, Cl. 15-264.000.

Yourd, Raymond A., III: *See*—
Gruber, Robert J.; Yourd, Raymond A., III; Julien, Paul C.; Knapp, John F.; and Bolte, Steven B., 4,879,199, Cl. 430-137.000.

Yuasa, Yuji: *See*—
Suzuki, Hirokazu; Machida, Yoshio; and Yuasa, Yuji, 4,878,499, Cl. 128-653.00A.

Yukimoto, Koji: *See*—
Kobayashi, Osamu; and Yukimoto, Koji, 4,878,573, Cl. 194-338.000.

Yumiyama, Shigeru, to Hitachi, Ltd. Permanent-magnet generator used for an ignition device of an internal combustion engine. 4,879,486, Cl. 310-254.000.

Zafiroglu, Dimitri P., to Du Pont de Nemours, E. I., and Company. Quilted elastic composite fabric. 4,879,169, Cl. 428-230.000.

Zandbergen, Todd A.: *See*—
Clark, Russell L.; Van Order, Kim L.; Suman, Michael J.; and Zandbergen, Todd A., 4,879,637, Cl. 362-141.000.

Zanetis, C. Christopher, to Alitec Corporation. Pavement planing machine. 4,878,713, Cl. 299-39.000.

Zapata Technologies, Inc.: *See*—
Shapcott, Michael, 4,879,025, Cl. 209-559.000.

Zappanti, James L.: *See*—
Stolarczyk, Larry G.; Smoker, Kurt A.; Boese, Gerald J.; Mondt, William E.; Hasenack, Marvin L., Jr.; Zappanti, James L.; Smith, Seth A.; and Moore, Edward D., 4,879,755, Cl. 455-3.000.

Zarn, Inc.: *See*—
Lee, Norman C., 4,878,592, Cl. 220-23.830.

Zeller, Norbert: *See*—
Fey, Volker; Pachaly, Bernd; and Zeller, Norbert, 4,879,142, Cl. 427-227.000.

Zemlin, John C., to Allied Resin Corporation. Fluid separatory devices having improved potting and adhesive compositions. 4,879,032, Cl. 210-321.610.

Zercie, Robert W.: *See*—
Mura, Albert J.; and Zercie, Robert W., 4,879,243, Cl. 436-63.000.

Zhang, Guang S.: *See*—
Chu, Fun S.; Wei, Ru-Dong; and Zhang, Guang S., 4,879,248, Cl. 436-543.000.

Ziegenbein, Botho: *See*—
Meinhold, Henner; Ziegenbein, Botho; and Petri, Gunther, 4,879,188, Cl. 429-7.000.

Ziemek, Gerhard: *See*—
Rohner, Peter; and Ziemek, Gerhard, 4,878,732, Cl. 350-96.230.

Zill, Kevin L.: *See*—
Rosenthal, Bruce C.; Zill, Kevin L.; Claerbaut, Kevin R.; Berglund, David M.; and Grover, Kenneth L., 4,878,524, Cl. 144-356.000.

Zimmermann, Egbert: *See*—
Nutzel, Oswald; Zimmermann, Egbert; and Jungwirth, Dieter, 4,878,327, Cl. 52-230.000.

Zinser Textilmaschinen GmbH: *See*—
Igel, Wolfgang, 4,878,344, Cl. 57-261.000.

Zlotek, Thaddeus F., to Dana Corporation. Surface hardened sprags and rollers. 4,878,570, Cl. 192-45.000.

Zobrist, Ray H.; and Morrone, William R., to Marion Laboratories, Inc. Method of ameliorating epileptic seizures. 4,879,289, Cl. 514-211.000.

Zsifkovits, Johann, to Emhart Industries Inc. Supporting mechanism for mould side portions in a glassware forming machine. 4,878,935, Cl. 65-323.000.

Zulauf, Inc.: *See*—
Reynolds, James M., 4,878,840, Cl. 433-9.000.

Zumoto, Nobuyuki; Sakamoto, Masahiko; and Hoshinouchi, Susumu, to Mitsubishi Denki Kabushiki Kaisha. Electron-beam exposure apparatus. 4,879,473, Cl. 250-492.200.

Zurawski, Vincent R., Jr.: *See*—
Wands, Jack R.; Zurawski, Vincent R., Jr.; and Schoemaker, Hubert J. P., 4,879,219, Cl. 435-7.000.

Zwambag, Henry: *See*—
Brouwer, Gerardus J.; and Zwambag, Henry, 4,878,542, Cl. 172-1.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 7TH DAY OF NOVEMBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Beckestrom, Bo, to Landstingens Inkopscentral, LIC, Ekonomisk Forening. Protector against incontinence or diaper. Re. 33,106, Cl. 604-385.200.

Biorex Laboratories Limited: *See*—
Vanstone, Anthony E.; Maile, Graham K.; and Nalbantoglu, Lynn K., Re. 33,109, Cl. 560-54.000.

Dikstein, Shabtay; and Hartzshtark, Abraham, to Yissum Research Development Company of the Hebrew University of Jerusalem. Compositions containing 1α-hydroxycholecalciferol for topical treatment of skin disorders and methods employing same. Re. 33,107, Cl. 514-46.000.

Hartzshtark, Abraham: *See*—
Dikstein, Shabtay; and Hartzshtark, Abraham, Re. 33,107, Cl. 514-46.000.

Ishikawa, Katsukiyo; Nishijima, Kanji; and Seio, Mamoru, to Nippon Paint Co., Ltd. Method for preparing a printed circuit board. Re. 33,108, Cl. 156-659.100.

Landstingens Inkopscentral, LIC, Ekonomisk Forening: *See*—
Beckestrom, Bo, Re. 33,106, Cl. 604-385.200.

Maile, Graham K.: *See*—
Vanstone, Anthony E.; Maile, Graham K.; and Nalbantoglu, Lynn K., Re. 33,109, Cl. 560-54.000.

Nalbantoglu, Lynn K.: *See*—
Vanstone, Anthony E.; Maile, Graham K.; and Nalbantoglu, Lynn K., Re. 33,109, Cl. 560-54.000.

Nippon Paint Co., Ltd.: *See*—
Ishikawa, Katsukiyo; Nishijima, Kanji; and Seio, Mamoru, Re. 33,108, Cl. 156-659.100.

Nishijima, Kanji: *See*—
Ishikawa, Katsukiyo; Nishijima, Kanji; and Seio, Mamoru, Re. 33,108, Cl. 156-659.100.

Seio, Mamoru: *See*—
Ishikawa, Katsukiyo; Nishijima, Kanji; and Seio, Mamoru, Re. 33,108, Cl. 156-659.100.

Vanstone, Anthony E.; Maile, Graham K.; and Nalbantoglu, Lynn K., to Biorex Laboratories Limited. Chalcone derivatives. Re. 33,109, Cl. 560-54.000.

Yissum Research Development Company of the Hebrew University of Jerusalem: *See*—
Dikstein, Shabtay; and Hartzshtark, Abraham, Re. 33,107, Cl. 514-46.000.

LIST OF DESIGN PATENTEES

Adams, Steven; Bull, William; and Peart, Stephen, to Apple Computer Inc. Housing for movable cursor control for a video display. 304,447, 11-7-89, Cl. D14-114.000.

Alco Industries, Inc.: *See*—
Goetz, Charles R., 304,398, Cl. D6-479.000.

Alexander, William, to W. Alexander Magic Art Supplies, Inc. Palette knife. 304,420, 11-7-89, Cl. D8-98.000.

Aloys F. Dornbracht GmbH & Co.: *See*—
Reinecke, Herbert, 304,491, Cl. D23-255.000.

Ancona, Bruce: *See*—
Ancona, Jane; and Ancona, Bruce, 304,406, Cl. D7-152.000.

Ancona, Jane; and Ancona, Bruce, to M. Kamenstein, Inc. Handle for kitchen utensil. 304,406, 11-7-89, Cl. D7-152.000.

Andrews, Donald L. Catenary arch building toy. 304,464, 11-7-89, Cl. D21-59.000.

Andrews, Donald L. Catenary arch barrel building toy. 304,465, 11-7-89, Cl. D21-59.000.

Apple Computer Inc.: *See*—
Adams, Steven; Bull, William; and Peart, Stephen, 304,447, Cl. D14-114.000.
De La Cruz, Michael; and Willnauer, Sigmar W., 304,448, Cl. D14-114.000.

Aquanaut, Inc.: *See*—
Maier, Robert W.; Patterson, Charles J.; Rief, Deiter; Gard, John; and Frentzel, Herman E., 304,505, Cl. D32-1.000.

Bakér, Michael; Stuart, Jerry E.; and Schultz, William H., to White Consolidated Industries, Inc. Combined blower and vacuum unit. 304,510, 11-7-89, Cl. D32-15.000.

Bakic, Karena, to Cosmede Anstalt. Cosmetic cap or similar article. 304,509, 11-7-89, Cl. D28-84.000.

Beaver, Ted L., to Continental Plastic Containers, Inc. Container body for liquids or the like. 304,423, 11-7-89, Cl. D9-376.000.

Beeren, Aloysius J. M., to U.S. Philips Corporation. Coffee maker. 304,408, 11-7-89, Cl. D7-309.000.

Beeren, Aloysius J. M., to U.S. Philips Corporation. Coffeemaker. 304,409, 11-7-89, Cl. D7-309.000.

Bemis Manufacturing Company: *See*—
Bemis, Richard A., 304,493, Cl. D24-8.000.

Bemis, Richard A., to Bemis Manufacturing Company. Container for disposing of hypodermic needles and other sharp medical items. 304,493, 11-7-89, Cl. D24-8.000.

Bergstedt, Donald C. Battery tester. 304,426, 11-7-89, Cl. D10-77.000.

Bertrand, Vic, to Ritvik Group Inc., The. Connector element for a construction toy. 304,471, 11-7-89, Cl. D21-141.000.

Best Chairs, Inc.: *See*—
Lange, Clement M., Jr., 304,393, Cl. D6-334.000.

Biddle, Ernest, to King Tester Corporation. Hardness testing block. 304,427, 11-7-89, Cl. D10-83.000.

Bounds, William E. Measuring spoon. 304,404, 11-7-89, Cl. D7-50.000.

Bridgestone Corporation: *See*—
Himuro, Yasuo; and Kobayashi, Tetsuro, 304,435, Cl. D12-146.000.

Briggs, Kenneth W., Sr., to Rushman Draperies, Inc. Window shutter. 304,497, 11-7-89, Cl. D25-47.000.

Brown, Paul D., to Reebok International Ltd. Shoe upper. 304,387, 11-7-89, Cl. D2-314.000.

Brown, Paul D., to Reebok International Ltd. Shoe upper. 304,388, 11-7-89, Cl. D2-314.000.

Brunell, Daniel J., to E.C. Leather Goods, Inc. Carrying case. 304,391, 11-7-89, Cl. D3-71.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Bracelet. 304,430, 11-7-89, Cl. D11-6.000.

Bull, William: *See*—
Adams, Steven; Bull, William; and Peart, Stephen, 304,447, Cl. D14-114.000.

Byers, Carroll C.; and Schmidt, Sheldon, to Loew-Cornell, Inc. Combined artist's brush holder and cleaning vessel. 304,512, 11-7-89, Cl. D32-35.000.

Carey, Bruce P., to USG Interiors, Inc. Subceiling panel unit. 304,498, 11-7-89, Cl. D25-58.000.

Carpenter, James H., to Pangborn Corporation. Vane for throwing wheel. 304,455, 11-7-89, Cl. D15-126.000.

Caruso, Jerome C.; Perl, Ludovic A.; and Shane, Robert M., to Shepherd Products U.S., Inc. Chair base with casters. 304,399, 11-7-89, Cl. D6-498.000.

Charet, Pierre; and Kraai, Duke, to Rally Manufacturing, Inc. Ashtray for automobile doors. 304,508, 11-7-89, Cl. D27-105.000.

Chen, Cheng Pin. Auxiliary automotive vehicle brake light. 304,504, 11-7-89, Cl. D26-28.000.

Coca-Cola Company, The: *See*—
Schechter, Alvin H.; and Thompson, Carl R., 304,413, Cl. D7-397.000.

Compaq Computer Corporation: *See*—
Mitchell, Thomas; and Granzow, Drew D., 304,439, Cl. D13-8.000.

Continental Plastic Containers, Inc.: *See*—
Beaver, Ted L., 304,423, Cl. D9-376.000.

Cosmede Anstalt: *See*—
Bakic, Karena, 304,509, Cl. D28-84.000.

Cowan, Murray L., to Textron Inc. Expansion bracelet. 304,431, 11-7-89, Cl. D11-25.000.

Cowen, Murray L., to Textron Inc. Expansion bracelet. 304,432, 11-7-89, Cl. D11-25.000.

Daiwa Seiko, Inc.: *See*—
Iwama, Shin-ichi, 304,386, Cl. D2-276.000.

Damratowski, Harold E.: *See*—
Elder, Paul S.; and Damratowski, Harold E., 304,486, Cl. D23-233.000.

David, Thomas J.: *See*—
Foran, Kenneth C.; and David, Thomas J., 304,461, Cl. D19-86.000.

Dawson Electrics Pty. Ltd.: *See*—
Dawson, Robert J., 304,424, Cl. D9-453.000.

Dawson, Robert J., to Dawson Electrics Pty. Ltd. Tamper proof container closure. 304,424, 11-7-89, Cl. D9-453.000.

De La Cruz, Michael; and Willnauer, Sigmar W., to Apple Computer Inc. Integrated circuit memory module. 304,448, 11-7-89, Cl. D14-114.000.
Dideriksen, Erling T., to Interlego A.G. Cockpit element for a toy aircraft. 304,468, 11-7-89, Cl. D21-91.000.
Dorman Products, Inc.: *See*—
Drake, Robert C., 304,440, Cl. D13-10.000.
Down Under Orphans Pty. Ltd.: *See*—
Neville, Henry, 304,474, Cl. D21-148.000.
Drake, Robert C., to Dorman Products, Inc. Protective case for storage battery terminal post and battery cable end connected thereto. 304,440, 11-7-89, Cl. D13-10.000.
E.C. Leather Goods, Inc.: *See*—
Brunell, Daniel J., 304,391, Cl. D3-71.000.
E&G Classics, Inc.: *See*—
Eash, David D., 304,437, Cl. D12-190.000.
Eash, David D., to E&G Classics, Inc. Grille cap for a vehicle. 304,437, 11-7-89, Cl. D12-190.000.
Edmonds, Keith, to Interplex Electronics, Inc. Breadboarding card for a personal computer. 304,441, 11-7-89, Cl. D13-24.000.
Elder, Paul S.; and Damratowski, Harold E., to Elder Valve, Inc. Housing for a shut-off valve. 304,486, 11-7-89, Cl. D23-233.000.
Elder Valve, Inc.: *See*—
Elder, Paul S.; and Damratowski, Harold E., 304,486, Cl. D23-233.000.
Eldon Industries, Inc.: *See*—
Evenson, Mel, 304,417, Cl. D8-50.000.
Evenson, Mel, 304,507, Cl. D26-76.000.
Elm Industry Co.: *See*—
Tanigami, Shintaro, 304,416, Cl. D8-49.000.
Ely, Ronald. Can opener. 304,414, 11-7-89, Cl. D8-18.000.
Evans, Dale M., to EVCO Office Products. Vertical file sorter. 304,462, 11-7-89, Cl. D19-90.000.
EVCO Office Products: *See*—
Evans, Dale M., 304,462, Cl. D19-90.000.
Evenson, Mel, to Eldon Industries, Inc. Stapler. 304,417, 11-7-89, Cl. D8-50.000.
Evenson, Mel, to Eldon Industries, Inc. Electric lighting fixture primarily intended for use with lecterns. 304,507, 11-7-89, Cl. D26-76.000.
Fenne, Kenneth R., to Pittway Corporation. Light control. 304,442, 11-7-89, Cl. D13-32.000.
Fiust, Gwendolyn A. Stuffed toy figure. 304,475, 11-7-89, Cl. D21-160.000.
Fiust, Gwendolyn A. Stuffed toy figure. 304,476, 11-7-89, Cl. D21-161.000.
Fiust, Gwendolyn A. Stuffed toy figure. 304,477, 11-7-89, Cl. D21-171.000.
Fiust, Gwendolyn A. Stuffed toy figure. 304,478, 11-7-89, Cl. D21-171.000.
Fiust, Gwendolyn A. Stuffed toy figure. 304,479, 11-7-89, Cl. D21-171.000.
Fiust, Gwendolyn A. Stuffed toy figure. 304,480, 11-7-89, Cl. D21-171.000.
Fiust, Gwendolyn A. Stuffed toy figure. 304,481, 11-7-89, Cl. D21-177.000.
Fiust, Gwendolyn A. Stuffed toy figure. 304,482, 11-7-89, Cl. D21-177.000.
Fleet Air: *See*—
Pike, Andrew A., 304,436, Cl. D12-156.000.
Foran, Kenneth C.; and David, Thomas J., to Rubbermaid Incorporated. Compartmented file box. 304,461, 11-7-89, Cl. D19-86.000.
Ford Motor Company: *See*—
Grinyer, Clive A.; and Papak, Eugene P., 304,443, Cl. D14-258.000.
Fossella, Gregory, to Jet Spray Corp. Beverage dispenser. 304,407, 11-7-89, Cl. D7-308.000.
Frentzel, Herman E.: *See*—
Maier, Robert W.; Patterson, Charles J.; Rief, Deiter; Gard, John; and Frentzel, Herman E., 304,505, Cl. D32-1.000.
Furey, Andrew J.: *See*—
Rosenwald, Frederic P.; and Furey, Andrew J., 304,494, Cl. D24-18.000.
Gard, John: *See*—
Maier, Robert W.; Patterson, Charles J.; Rief, Deiter; Gard, John; and Frentzel, Herman E., 304,505, Cl. D32-1.000.
Gelardi, Paul J.; and MacLeod, Robert B., Jr., to Shape Inc. Tape cassette. 304,452, 11-7-89, Cl. D14-121.000.
Glickman, Michael P., to Strombecker Corporation. Multiring bubble toy. 304,466, 11-7-89, Cl. D21-61.000.
Goetz, Charles R., to Alco Industries, Inc. Corner unit. 304,398, 11-7-89, Cl. D6-479.000.
Gold Star Co., Ltd.: *See*—
Yoo, Seung H., 304,411, Cl. D7-351.000.
Goldstein, Edwin: *See*—
Pitchersky, Steven J.; and Goldstein, Edwin, 304,396, Cl. D6-451.000.
Granzow, Drew D.: *See*—
Mitchell, Thomas; and Granzow, Drew D., 304,439, Cl. D13-8.000.
Grinyer, Clive A.; and Papak, Eugene P., to Ford Motor Company. Front control panel for a vehicular combined tape player and radio or the like. 304,443, 11-7-89, Cl. D14-258.000.
H. G. Wallace Limited: *See*—
Thomas, Madeline, 304,496, Cl. D24-54.000.
Hara, Akira: *See*—
Hara, Koichi; and Hara, Akira, 304,425, Cl. D10-12.000.
Hara, Koichi; and Hara, Akira. Tape measure case. 304,425, 11-7-89, Cl. D10-12.000.
Harmer, Warren E., to W. E. Harmer Associates Pty. Ltd. Chair/-lounge. 304,394, 11-7-89, Cl. D6-361.000.
Hawker Pacific Pty. Limited: *See*—
Holdaway, Gary J., 304,421, Cl. D8-373.000.
Heidemann, Albert; and Kappler, Michael, to Osram GmbH. Compact fluorescent lamp. 304,502, 11-7-89, Cl. D26-3.000.
Heli Plex, Inc.: *See*—
Waldrup, Herman H., 304,438, Cl. D12-345.000.
Henck, Loral A.: *See*—
Henck, Rex P.; and Henck, Loral A., 304,419, Cl. D8-61.000.
Henck, Rex P.; and Henck, Loral A. Angularly adjustable pneumatic hammer. 304,419, 11-7-89, Cl. D8-61.000.
Hengesbach, Robert W. Flow control valve and nozzle. 304,487, 11-7-89, Cl. D23-245.000.
Hengesbach, Robert W. Combined flow control valve and nozzle. 304,488, 11-7-89, Cl. D23-245.000.
Hengesbach, Robert W. Combined flow control valve and nozzle. 304,489, 11-7-89, Cl. D23-245.000.
Hengesbach, Robert W. Flow control valve. 304,490, 11-7-89, Cl. D23-245.000.
Hestair Kiddicraft Limited: *See*—
Thomson, Harry S.; Raffo, David M.; and Pape, John A., 304,483, Cl. D21-105.000.
Himuro, Yasuo; and Kobayashi, Tetsuro, to Bridgestone Corporation. Automobile tire. 304,435, 11-7-89, Cl. D12-146.000.
Hinton, Earle L.: *See*—
Vezirian, Edward; and Hinton, Earle L., 304,514, Cl. D99-25.000.
Hirschhorn, Martin, to Time in Motion, Inc. Watch face. 304,429, 11-7-89, Cl. D10-126.000.
Holdaway, Gary J., to Hawker Pacific Pty. Limited. Extension tube clip. 304,421, 11-7-89, Cl. D8-373.000.
Holewinski, Robert D., to Johnson & Johnson Consumer Products, Inc. Platform container with transparent lid. 304,422, 11-7-89, Cl. D9-347.000.
Holterscheidt, Siegfried, to Walter Henkels GmbH. Combined desk stand. 304,460, 11-7-89, Cl. D19-77.000.
Hoover, Rick L.; and Rodgers, James L., to Kurta Corporation. Four button cursor. 304,446, 11-7-89, Cl. D14-114.000.
Hoover, Rick L.: *See*—
Rodgers, James L.; and Hoover, Rick L., 304,449, Cl. D14-114.000.
Hosogai, Hideyuki; and Morihiro, Junji, to Matsushita Graphic Communication Systems, Inc. Facsimile transceiver. 304,450, 11-7-89, Cl. D14-118.000.
Hvizdak, Judith L.: *See*—
Wright, Jeffrey; and Hvizdak, Judith L., 304,397, Cl. D6-454.000.
Ikeya, Shiro, to Nitsuko Limited. Point of sale terminal. 304,444, 11-7-89, Cl. D14-105.000.
Interlego A.G.: *See*—
Dideriksen, Erling T., 304,468, Cl. D21-91.000.
Knudsen, Jens N., 304,470, Cl. D21-108.000.
Knudsen, Jens N., 304,484, Cl. D21-189.000.
Poulsen, Ole V., 304,472, Cl. D21-141.000.
Poulsen, Ole V., 304,473, Cl. D21-141.000.
Tapdrup, Erik P., 304,467, Cl. D21-91.000.
Interplex Electronics, Inc.: *See*—
Edmonds, Keith, 304,441, Cl. D13-24.000.
Iwama, Shin-ichi, to Daiwa Seiko, Inc. Ski boot. 304,386, 11-7-89, Cl. D2-276.000.
Jet Spray Corp.: *See*—
Fossella, Gregory, 304,407, Cl. D7-308.000.
John Manufacturing Limited: *See*—
Yuen, John S., 304,511, Cl. D32-18.000.
Johnson & Johnson Consumer Products, Inc.: *See*—
Holewinski, Robert D., 304,422, Cl. D9-347.000.
Kabushiki Kaisha Tominaga Jyushi Kogyosho: *See*—
Tominaga, Kazutoshi, 304,506, Cl. D30-106.000.
Kagayama, Katsuji; Mishiro, Benito; and Sugiyama, Yoshihiko, to Matsushita Electric Industrial Co., Ltd. Key board for a computer. 304,451, 11-7-89, Cl. D14-115.000.
Kappler, Michael: *See*—
Heidemann, Albert; and Kappler, Michael, 304,502, Cl. D26-3.000.
Kemnitz, Glen D., to Sunbeam Corporation. Domestic scale. 304,428, 11-7-89, Cl. D10-92.000.
King Tester Corporation: *See*—
Biddle, Ernest, 304,427, Cl. D10-83.000.
Knudsen, Jens N., to Interlego A.G. Toy curved wall element. 304,470, 11-7-89, Cl. D21-108.000.
Knudsen, Jens N., to Interlego A.G. Toy caparison. 304,484, 11-7-89, Cl. D21-189.000.
Kobayashi, Tetsuro: *See*—
Himuro, Yasuo; and Kobayashi, Tetsuro, 304,435, Cl. D12-146.000.
Konsumex Kulkerskedelmi Vallalat: *See*—
Kovesdi, Janos, 304,469, Cl. D21-108.000.
Kovesdi, Janos, to Konsumex Kulkerskedelmi Vallalat. Toy construction piece. 304,469, 11-7-89, Cl. D21-108.000.
Kraai, Duke: *See*—
Charet, Pierre; and Kraai, Duke, 304,508, Cl. D27-105.000.
Kuba, Lawrence M., to Wang Laboratories, Inc. Video display. 304,445, 11-7-89, Cl. D14-113.000.
Kurta Corporation: *See*—
Hoover, Rick L.; and Rodgers, James L., 304,446, Cl. D14-114.000.
Rodgers, James L.; and Hoover, Rick L., 304,449, Cl. D14-114.000.
Lam, Michael C. B. Pair of linked candles. 304,503, 11-7-89, Cl. D26-7.000.
Lambert, Gary F. Combined picture greeting card and display means. 304,459, 11-7-89, Cl. D19-2.000.

Lange, Clement M., Jr., to Best Chairs, Inc. Swivel rocker. 304,393, 11-7-89, Cl. D6-334.000.

Levick, Lois B. Pita bread sandwich holder. 304,405, 11-7-89, Cl. D7-70.000.

Lithibar Matik, Inc.: *See—*
VanWassehnova, Emerson J.; and Sagar, Percy K., 304,500, Cl. D25-114.000.
VanWassehnova, Emerson J.; and Sagar, Percy K., 304,501, Cl. D25-114.000.

Loew-Cornell, Inc.: *See—*
Byers, Carroll C.; and Schmidt, Sheldon, 304,512, Cl. D32-35.000.

Loffredo, Carmen V. Dusting and waxing device. 304,513, 11-7-89, Cl. D32-40.000.

Long, D. Clayton, to MacGregor Golf Company. Golf iron head. 304,485, 11-7-89, Cl. D21-220.000.

M. Kamenstein, Inc.: *See—*
Ancona, Jane; and Ancona, Bruce, 304,406, Cl. D7-152.000.

MacGregor Golf Company: *See—*
Long, D. Clayton, 304,485, Cl. D21-220.000.

MacLeod, Robert B., Jr.: *See—*
Gelardi, Paul J.; and MacLeod, Robert B., Jr., 304,452, Cl. D14-121.000.

Maier, Robert W.; Patterson, Charles J.; Rief, Deiter; Gard, John; and Frentzel, Herman E., to Aquanaut, Inc. Underwater pool cleaning apparatus. 304,505, 11-7-89, Cl. D32-1.000.

Matsushima, Takashi, to Sharp Kabushiki Kaisha. Clock radio. 304,453, 11-7-89, Cl. D14-170.000.

Matsushita Electric Industrial Co., Ltd.: *See—*
Kagayama, Katsuji; Mishiro, Benito; and Sugiyama, Yoshihiko, 304,451, Cl. D14-115.000.

Matsushita Graphic Communication Systems, Inc.: *See—*
Hosogai, Hideyuki; and Morihiro, Junji, 304,450, Cl. D14-118.000.

McConnell, Theo, Jr. Earring. 304,433, 11-7-89, Cl. D11-78.000.

Miller, David E., to Reebok International Ltd. Shoe upper. 304,389, 11-7-89, Cl. D2-314.000.

Mishiro, Benito: *See—*
Kagayama, Katsuji; Mishiro, Benito; and Sugiyama, Yoshihiko, 304,451, Cl. D14-115.000.

Mitchell, Thomas; and Granzow, Drew D., to Compaq Computer Corporation. Battery pack. 304,439, 11-7-89, Cl. D13-8.000.

Morihiro, Junji: *See—*
Hosogai, Hideyuki; and Morihiro, Junji, 304,450, Cl. D14-118.000.

Mowry, William H., Jr., to Standard Register Co., The. Numeral font. 304,458, 11-7-89, Cl. D18-24.000.

Nabisco Brands, Inc.: *See—*
Spiel, Albert; and Spanier, Henry C., 304,385, Cl. D1-106.000.

Nakano, Kiyotaka, to Nippon Rubber Co., Ltd. Shoe sole. 304,390, 11-7-89, Cl. D2-320.000.

Neville, Henry, to Down Under Orphans Pty. Ltd. Toy animal. 304,474, 11-7-89, Cl. D21-148.000.

Nippon Rubber Co., Ltd.: *See—*
Nakano, Kiyotaka, 304,390, Cl. D2-320.000.

Nishibori, Hiroshi, to Sharp Kabushiki Kaisha. Microwave oven. 304,412, 11-7-89, Cl. D7-351.000.

Nitsuko Limited: *See—*
Ikeya, Shiro, 304,444, Cl. D14-105.000.

North American Philips Corp.: *See—*
Tsuji, Masao, 304,410, Cl. D7-309.000.

Osram GmbH: *See—*
Heidemann, Albert; and Kappler, Michael, 304,502, Cl. D26-3.000.

Pangborn Corporation: *See—*
Carpenter, James H., 304,455, Cl. D15-126.000.

Papak, Eugene P.: *See—*
Grinyer, Clive A.; and Papak, Eugene P., 304,443, Cl. D14-258.000.

Pape, John A.: *See—*
Thomson, Harry S.; Raffo, David M.; and Pape, John A., 304,483, Cl. D21-105.000.

Partecipazioni Bulgari S.p.A.: *See—*
Bulgari, Paolo, 304,430, Cl. D11-6.000.

Patterson, Charles J.: *See—*
Maier, Robert W.; Patterson, Charles J.; Rief, Deiter; Gard, John; and Frentzel, Herman E., 304,505, Cl. D32-1.000.

Peart, Stephen: *See—*
Adams, Steven; Bull, William; and Peart, Stephen, 304,447, Cl. D14-114.000.

Perl, Ludovic A.: *See—*
Caruso, Jerome C.; Perl, Ludovic A.; and Shane, Robert M., 304,399, Cl. D6-498.000.

Pike, Andrew A., to Fleet Air. Removable vehicle top. 304,436, 11-7-89, Cl. D12-156.000.

Pilling Company: *See—*
Rosenwald, Frederic P.; and Furey, Andrew J., 304,494, Cl. D24-18.000.

Pitchersky, Steven J.; and Goldstein, Edwin, to Pitchersky, Steven J.; and Goldstein, Edwin. Table. 304,396, 11-7-89, Cl. D6-451.000.

Pittway Corporation: *See—*
Fenne, Kenneth R., 304,442, Cl. D13-32.000.

Plus Corporation: *See—*
Takahashi, Yoshihiro, 304,456, Cl. D15-132.000.

Poulsen, Ole V., to Interlego A.G. Housing for a toy steering gear rod. 304,472, 11-7-89, Cl. D21-141.000.

Poulsen, Ole V., to Interlego A.G. Steering gear for a toy vehicle. 304,473, 11-7-89, Cl. D21-141.000.

Raffo, David M.: *See—*
Thomson, Harry S.; Raffo, David M.; and Pape, John A., 304,483, Cl. D21-105.000.

Rally Manufacturing, Inc.: *See—*
Charet, Pierre; and Kraai, Duke, 304,508, Cl. D27-105.000.

Reebok International Ltd.: *See—*
Brown, Paul D., 304,387, Cl. D2-314.000.
Brown, Paul D., 304,388, Cl. D2-314.000.
Miller, David E., 304,389, Cl. D2-314.000.

Regan, James L. Paint can rim piercer. 304,415, 11-7-89, Cl. D8-18.000.

Reich, Maurice M. Cosmetic brush. 304,392, 11-7-89, Cl. D4-135.000.

Reinecke, Herbert, to Aloys F. Dornbracht GmbH & Co. Spout. 304,491, 11-7-89, Cl. D23-255.000.

Rief, Deiter: *See—*
Maier, Robert W.; Patterson, Charles J.; Rief, Deiter; Gard, John; and Frentzel, Herman E., 304,505, Cl. D32-1.000.

Ritvik Group Inc., The: *See—*
Bertrand, Vic, 304,471, Cl. D21-141.000.

Rodgers, James L.; and Hoover, Rick L., to Kurta Corporation. Cursor. 304,449, 11-7-89, Cl. D14-114.000.

Rodgers, James L.: *See—*
Hoover, Rick L.; and Rodgers, James L., 304,446, Cl. D14-114.000.

Rogers, Orley D.; and Staten, Kenneth E., to Stageright Corporation. Folding stair unit. 304,499, 11-7-89, Cl. D25-62.000.

Rosenwald, Frederic P.; and Furey, Andrew J., to Pilling Company. Laryngoscope. 304,494, 11-7-89, Cl. D24-18.000.

Rowoco Inc.: *See—*
Wolff, Joan P., 304,403, Cl. D7-43.000.

Rubbermaid Incorporated: *See—*
Foran, Kenneth C.; and David, Thomas J., 304,461, Cl. D19-86.000.

Rushman Draperies, Inc.: *See—*
Briggs, Kenneth W., Sr., 304,497, Cl. D25-47.000.

Sagar, Percy K.: *See—*
VanWassehnova, Emerson J.; and Sagar, Percy K., 304,500, Cl. D25-114.000.
VanWassehnova, Emerson J.; and Sagar, Percy K., 304,501, Cl. D25-114.000.

Sanrio Company, Ltd.: *See—*
Tsuji, Shintaro, 304,418, Cl. D8-57.000.

Schechter, Alvin H.; and Thompson, Carl R., to Coca-Cola Company, The. Tower for a beverage dispenser. 304,413, 11-7-89, Cl. D7-397.000.

Schmidt, Sheldon: *See—*
Byers, Carroll C.; and Schmidt, Sheldon, 304,512, Cl. D32-35.000.

Schuller, Georg, to Semperit Reifen Aktiengesellschaft. Vehicle tire. 304,434, 11-7-89, Cl. D12-146.000.

Schultz, William H.: *See—*
Baker, Michael; Stuart, Jerry E.; and Schultz, William H., 304,510, Cl. D32-15.000.

Schultz, Wilmer R. Back for a stadium seat. 304,400, 11-7-89, Cl. D6-502.000.

Semperit Reifen Aktiengesellschaft: *See—*
Schuller, Georg, 304,434, Cl. D12-146.000.

Serres, John R. Satellite dish cover. 304,454, 11-7-89, Cl. D14-231.000.

Shane, Robert M.: *See—*
Caruso, Jerome C.; Perl, Ludovic A.; and Shane, Robert M., 304,399, Cl. D6-498.000.

Shape Inc.: *See—*
Gelardi, Paul J.; and MacLeod, Robert B., Jr., 304,452, Cl. D14-121.000.

Sharp Kabushiki Kaisha: *See—*
Matsushima, Takashi, 304,453, Cl. D14-170.000.
Nishibori, Hiroshi, 304,412, Cl. D7-351.000.
Tsukada, Akira, 304,457, Cl. D18-13.000.

Shepherd Products U.S., Inc.: *See—*
Caruso, Jerome C.; Perl, Ludovic A.; and Shane, Robert M., 304,399, Cl. D6-498.000.

Spanier, Henry C.: *See—*
Spiel, Albert; and Spanier, Henry C., 304,385, Cl. D1-106.000.

Spiel, Albert; and Spanier, Henry C., to Nabisco Brands, Inc. Canine biscuit. 304,385, 11-7-89, Cl. D1-106.000.

Stageright Corporation: *See—*
Rogers, Orley D.; and Staten, Kenneth E., 304,499, Cl. D25-62.000.

Standard Register Co., The: *See—*
Mowry, William H., Jr., 304,458, Cl. D18-24.000.

Staten, Kenneth E.: *See—*
Rogers, Orley D.; and Staten, Kenneth E., 304,499, Cl. D25-62.000.

Strombecker Corporation: *See—*
Glickman, Michael P., 304,466, Cl. D21-61.000.

Stuart, Jerry E.: *See—*
Baker, Michael; Stuart, Jerry E.; and Schultz, William H., 304,510, Cl. D32-15.000.

Sugiyama, Yoshihiko: *See—*
Kagayama, Katsuji; Mishiro, Benito; and Sugiyama, Yoshihiko, 304,451, Cl. D14-115.000.

Sunbeam Corporation: *See—*
Kemnitz, Glen D., 304,428, Cl. D10-92.000.

Takahashi, Yoshihiro, to Plus Corporation. Paper hole drill. 304,456, 11-7-89, Cl. D15-132.000.

Tanigami, Shintaro, to Elm Industry Co. Stapler. 304,416, 11-7-89, Cl. D8-49.000.

Tapdrup, Erik P., to Interlego A.G. Engine for a toy aircraft. 304,467, 11-7-89, Cl. D21-91.000.

Taylor, Vernon R. Floral display stand. 304,395, 11-7-89, Cl. D6-405.000.

Textron Inc.: *See—*
Cowan, Murray L., 304,431, Cl. D11-25.000.
Cowen, Murray L., 304,432, Cl. D11-25.000.

Thomas, Madeline, to H. G. Wallace Limited. Female urinal. 304,496, 11-7-89, Cl. D24-54.000.

Thompson, Carl R.: *See*—
Schechter, Alvin H.; and Thompson, Carl R., 304,413, Cl. D7-397.000.

Thomson, Harry S.; Raffo, David M.; and Pape, John A., to Hestair Kiddicraft Limited. Pull toy. 304,483, 11-7-89, Cl. D21-105.000.

Tiitinen, Terri. Electric heating element. 304,492, 11-7-89, Cl. D23-386.000.

Time in Motion, Inc.: *See*—
Hirschhorn, Martin, 304,429, Cl. D10-126.000.

Tominaga, Kazutoshi, to Kabushiki Kaisha Tominaga Jyushi Kogyo-sho. Aquarium cleaner. 304,506, 11-7-89, Cl. D30-106.000.

Tomy Kogyo Co., Inc.: *See*—
Watanabe, Makiko, 304,463, Cl. D21-12.000.

Tsuji, Masao, to North American Philips Corp. Coffee maker. 304,410, 11-7-89, Cl. D7-309.000.

Tsuji, Shintaro, to Sanrio Company, Ltd. Scissors. 304,418, 11-7-89, Cl. D8-57.000.

Tsukada, Akira, to Sharp Kabushiki Kaisha. Printer for cash register. 304,457, 11-7-89, Cl. D18-13.000.

Tyo, Diane: *See*—
Tyo, James; and Tyo, Diane, 304,495, Cl. D24-36.000.

Tyo, James; and Tyo, Diane. Scar massaging roller. 304,495, 11-7-89, Cl. D24-36.000.

U.S. Philips Corporation: *See*—
Beeren, Aloysius J. M., 304,408, Cl. D7-309.000.
Beeren, Aloysius J. M., 304,409, Cl. D7-309.000.

USG Interiors, Inc.: *See*—
Carey, Bruce P., 304,498, Cl. D25-58.000.

Van Hoose, James R. Paper dispenser. 304,402, 11-7-89, Cl. D6-523.000.

VanWassehnova, Emerson J.; and Sagar, Percy K., to Lithibar Matik, Inc. Six cavity building block. 304,500, 11-7-89, Cl. D25-114.000.

VanWassehnova, Emerson J.; and Sagar, Percy K., to Lithibar Matik, Inc. Four cavity building block. 304,501, 11-7-89, Cl. D25-114.000.

Vezirian, Edward; and Hinton, Earle L. Communion cup. 304,514, 11-7-89, Cl. D99-25.000.

W. Alexander Magic Art Supplies, Inc.: *See*—
Alexander, William, 304,420, Cl. D8-98.000.

W. E. Harmer Associates Pty. Ltd.: *See*—
Harmer, Warren E., 304,394, Cl. D6-361.000.

Wagner, Leonard A. Combined wine and glass rack. 304,401, 11-7-89, Cl. D6-514.000.

Waldrup, Herman H., to Heli Plex, Inc. Helicopter windshield unit. 304,438, 11-7-89, Cl. D12-345.000.

Walter Henkels GmbH: *See*—
Holterscheidt, Siegfried, 304,460, Cl. D19-77.000.

Wang Laboratories, Inc.: *See*—
Kuba, Lawrence M., 304,445, Cl. D14-113.000.

Watanabe, Makiko, to Tomy Kogyo Co., Inc. Water game housing. 304,463, 11-7-89, Cl. D21-12.000.

White Consolidated Industries, Inc.: *See*—
Baker, Michael; Stuart, Jerry E.; and Schultz, William H., 304,510, Cl. D32-15.000.

Willnauer, Sigmar W.: *See*—
De La Cruz, Michael; and Willnauer, Sigmar W., 304,448, Cl. D14-114.000.

Wolff, Joan P., to Rowoco Inc. Cutter for pie top dough. 304,403, 11-7-89, Cl. D7-43.000.

Wright, Jeffrey; and Hvizdak, Judith L. Display stand. 304,397, 11-7-89, Cl. D6-454.000.

Yoo, Seung H., to Gold Star Co., Ltd. Microwave oven. 304,411, 11-7-89, Cl. D7-351.000.

Yuen, John S., to John Manufacturing Limited. Rechargeable vacuum cleaner. 304,511, 11-7-89, Cl. D32-18.000.

LIST OF PLANT PATENTEES

Holtkamp Reinhold, Sr. African violet plant named Gemini. 7,053, 11–7–89, Cl.69.000.

Sapia, Flavio. Carnation plant named Milly. 7,054, 11-7-89, Cl. 71.000.

Sapia, Flavio. Carnation plant named Milly. 7,054, 11-7-89, Cl. 71.000.

LIST OF STATUTORY INVENTION REGISTRATIONS

APPLICANTS TO WHOM

STATUTORY INVENTION REGISTRATIONS WERE ISSUED ON THE 7TH DAY OF NOVEMBER, 1989

Ancheta, Antonio D. Two cycle internal combustion engine. H701, 11-7-89, Cl. 123-65.0VB.

Dillinger, Robert B.: *See—*
Hooper, John O.; Heydlauff, Bruce M.; and Dillinger, Robert B., H710, Cl. 342-434.000.

Di Vita, Sam; Malecki, Edmund E.; and Kubricky, Loretta J., to United States of America, Army. Method and apparatus for optical fiber transmission in a utility conduit containing a hostile fluid. H704, 11-7-89, Cl. 350-96.230.

Farinacci, Anthony L. Probe nose training cartridge. H700, 11-7-89, Cl. 102-529.000.

Fuji Photo Film Co., Ltd.: *See—*
Takahashi, Osamu; Furutachi, Nobuo; and Morigaki, Masakazu, H706, Cl. 430-551.000.

Furutachi, Nobuo: *See—*
Takahashi, Osamu; Furutachi, Nobuo; and Morigaki, Masakazu, H706, Cl. 430-551.000.

Harada, Kiyoshi; Takahashi, Kazuo; and Kawasaki, Mikio, to Konica Corporation. Exposure device. H711, 11-7-89, Cl. 355-67.000.

Hartman, Richard L., to United States of America, Army. Method of stellar navigation using an optical correlator. H712, 11-7-89, Cl. 364-456.000.

Heydlauff, Bruce M.: *See—*
Hooper, John O.; Heydlauff, Bruce M.; and Dillinger, Robert B., H710, Cl. 342-434.000.

Hooper, John O.; Heydlauff, Bruce M.; and Dillinger, Robert B., to United States of America, Navy. Horizon reference system for a rotating body. H710, 11-7-89, Cl. 342-434.000.

Hu, Chemning; and Terrill, Kyle W., to United States of America, Navy. Method of preventing latch-up failures of CMOS integrated circuits. H707, 11-7-89, Cl. 437-26.000.

Kawasaki, Mikio: *See—*
Harada, Kiyoshi; Takahashi, Kazuo; and Kawasaki, Mikio, H711, Cl. 355-67.000.

Konica Corporation: *See—*
Harada, Kiyoshi; Takahashi, Kazuo; and Kawasaki, Mikio, H711, Cl. 355-67.000.

Kubricky, Loretta J.: *See—*
Di Vita, Sam; Malecki, Edmund E.; and Kubricky, Loretta J., H704, Cl. 350-96.230.

Link, Frank B.: *See—*
May, Roger A.; and Link, Frank B., H713, Cl. 364-517.000.

Malecki, Edmund E.: *See—*
Di Vita, Sam; Malecki, Edmund E.; and Kubricky, Loretta J., H704, Cl. 350-96.230.

May, Roger A.; and Link, Frank B., to United States of America, Air Force. Automatic target detection and recognition. H713, 11-7-89, Cl. 364-517.000.

McDowell, Vaughn P., to United States of America, Navy. Serial data word processing arrangement. H714, 11-7-89, Cl. 364-900.000.

Means, Gordon E.: *See—*
Shively, Gary; Means, Gordon E.; and Staniec, Robert, H702, Cl. 187-94.000.

Morigaki, Masakazu: *See—*
Takahashi, Osamu; Furutachi, Nobuo; and Morigaki, Masakazu, H706, Cl. 430-551.000.

Morris, Augustus, Jr.: *See—*
Repperger, Daniel W.; and Morris, Augustus, Jr., H703, Cl. 244-221.000.

Oka, Youichi; Sawada, Hitoshi; and Yokoyama, Masao. Method of producing diacetone sorbose. H708, 11-7-89, Cl. 536-18.500.

Otis Elevator Company: *See—*
Shively, Gary; Means, Gordon E.; and Staniec, Robert, H702, Cl. 187-94.000.

Repperger, Daniel W.; and Morris, Augustus, Jr., to United States of America, Air Force. Manual control apparatus with electable mechanical impedance. H703, 11-7-89, Cl. 244-221.000.

Sawada, Hitoshi: *See—*
Oka, Youichi; Sawada, Hitoshi; and Yokoyama, Masao, H708, Cl. 536-18.500.

Selzer, Joel H.; and Smith, Michael D. Process for making smoke producing composition. H705, 11-7-89, Cl. 149-109.600.

Shively, Gary; Means, Gordon E.; and Staniec, Robert, to Otis Elevator Company. Controlling the motion of a compensating rope in an elevator. H702, 11-7-89, Cl. 187-94.000.

Smith, Michael D.: *See—*
Selzer, Joel H.; and Smith, Michael D., H705, Cl. 149-109.600.

Staniec, Robert: *See—*
Shively, Gary; Means, Gordon E.; and Staniec, Robert, H702, Cl. 187-94.000.

Takahashi, Kazuo: *See—*
Harada, Kiyoshi; Takahashi, Kazuo; and Kawasaki, Mikio, H711, Cl. 355-67.000.

Takahashi, Osamu; Furutachi, Nobuo; and Morigaki, Masakazu, to Fuji Photo Film Co., Ltd. Silver halide color photosensitive materials. H706, 11-7-89, Cl. 430-551.000.

Terrill, Kyle W.: *See—*
Hu, Chemning; and Terrill, Kyle W., H707, Cl. 437-26.000.

Thomas, Terry E., Sr., to United States of America, Army. Submunition fuse with removable blocker. H697, 11-7-89, Cl. 102-239.000.

Thomas, Terry E., Sr., to United States of America, Army. Submunition fuse. H698, 11-7-89, Cl. 102-245.000.

Thomas, Terry E., Sr., to United States of America, Army. Submunition fuse with pyrotechnic ignition. H699, 11-7-89, Cl. 102-370.000.

United States of America
- Air Force: *See—*
  - May, Roger A.; and Link, Frank B., H713, Cl. 364-517.000.
  - Repperger, Daniel W.; and Morris, Augustus, Jr., H703, Cl. 244-221.000.
- Army: *See—*
  - Di Vita, Sam; Malecki, Edmund E.; and Kubricky, Loretta J., H704, Cl. 350-96.230.
  - Hartman, Richard L., H712, Cl. 364-456.000.
  - Thomas, Terry E., Sr., H697, Cl. 102-239.000.
  - Thomas, Terry E., Sr., H698, Cl. 102-245.000.
  - Thomas, Terry E., Sr., H699, Cl. 102-370.000.
- Navy: *See—*
  - Hooper, John O.; Heydlauff, Bruce M.; and Dillinger, Robert B., H710, Cl. 342-434.000.
  - Hu, Chemning; and Terrill, Kyle W., H707, Cl. 437-26.000.
  - McDowell, Vaughn P., H714, Cl. 364-900.000.
  - West, Leonard R., H709, Cl. 219-523.000.

West, Leonard R., to United States of America, Navy. Heater system for curing rocket motor materials. H709, 11-7-89, Cl. 219-523.000.

Yokoyama, Masao: *See—*
Oka, Youichi; Sawada, Hitoshi; and Yokoyama, Masao, H708, Cl. 536-18.500.

CLASSIFICATION OF PATENTS

ISSUED NOVEMBER 7, 1989

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 4

236 4,878,255
326 4,878,256
658 4,878,257

CLASS 5

420 4,878,258
451 4,878,259

CLASS 7

129 4,878,260

CLASS 8

476 4,878,920
646 4,878,921

CLASS 08

10/89 4,879,214

CLASS 15

41 R 4,878,261
53 B 4,878,262
250.32 4,878,263
264 4,878,264

CLASS 16

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225 4,878,266
250 4,878,267

CLASS 19

258 4,878,268

CLASS 24

115 G 4,878,269
132 R 4,878,270
194 4,878,271
196 4,878,272
289 4,878,273
306 4,878,274
436 4,878,275
511 4,878,276
633 4,878,277

CLASS 28

142 4,878,278
203 4,878,279
274 4,878,280

CLASS 29

116.1 4,878,281
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243.53 4,878,284
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467 4,878,286
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568 4,878,288
596 4,878,289
603 4,878,290
606 4,878,291
734 4,878,292
850 4,878,293
852 4,878,294
863 4,878,295

CLASS 33

227 4,878,296
366 4,878,297
837 4,878,298

CLASS 34

35 4,878,299

CLASS 36

35 R 4,878,300
69 4,878,301

CLASS 40

302 4,878,302
606 4,878,303

CLASS 42

71.02 4,878,304
72 4,878,305
90 4,878,306
101 4,878,307
102 4,878,308

CLASS 43

18.1 4,878,309
42.04 4,878,310
54.1 4,878,311

CLASS 44

502 4,878,922

CLASS 47

1.1 4,878,312
87 4,878,313

CLASS 49

381 4,878,314

CLASS 51

165 R 4,878,315
168 4,878,316
170 TL 4,878,317
178 4,878,318
271 4,878,319
320 4,878,320
358 4,878,321

CLASS 52

2 4,878,322
92 4,878,323
125.2 4,878,324
217 4,878,325
218 4,878,326
230 4,878,327
233 4,878,328
245 4,878,329
475 4,878,330
519 4,878,331
741 4,878,332

CLASS 53

53 4,878,333
399 4,878,334
434 4,878,335
500 4,878,336
534 4,878,337

CLASS 55

185 4,878,923
204 4,878,924
235 4,878,925
294 4,878,926
302 4,878,927
466 4,878,928
486 4,878,929
493 4,878,930

CLASS 56

7 4,878,338
14.7 4,878,339
249 4,878,340
364 4,878,341

CLASS 57

58.49 4,878,342
222 4,878,343
261 4,878,344

CLASS 59

15 4,878,345

CLASS 60

588 4,878,346
608 4,878,347
660 4,878,348
674 4,878,349

CLASS 62

17 4,878,931
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50.1 4,878,350
51.1 4,878,351
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63 4,878,354
115 4,878,355
149 4,878,356
160 4,878,357
227 4,878,358
239 4,878,359
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352 4,878,361
381 4,878,362
400 4,878,363

CLASS 63

28 4,878,364

CLASS 65

29 4,878,933
60.52 4,878,934
323 4,878,935

CLASS 68

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CLASS 70

14 4,878,366
491 4,878,367

CLASS 71

7 4,878,936
90 4,878,937
92 4,878,938
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4,878,940
93 4,878,941
109 4,878,942

CLASS 72

9 4,878,368
12 4,878,369
264 4,878,370
390 4,878,371
391 4,878,372
420 4,878,373
446 4,878,374

CLASS 73

19 4,878,375
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59 4,878,377
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60 4,878,379
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153 4,878,382
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379 4,878,384
704 4,878,385
861.22 4,878,386
866.3 4,878,387
866.4 4,878,388

CLASS 74

10.8 4,878,402
18.1 4,878,389
89.15 4,878,390
89.2 4,878,391
333 4,878,392
479 4,878,393
493 4,878,394
518 4,878,396
531 4,878,395
551.1 4,878,397
665 T 4,878,399
715 4,878,400
781 R 4,878,401
959 4,878,398

CLASS 75

25 4,878,943
4,878,944
118 R 4,878,945

CLASS 76

107 R 4,878,403

CLASS 81

54 4,878,404
57.31 4,878,405
436 4,878,406

CLASS 83

13 4,878,407
444 4,878,408
466 4,878,409
635 4,878,410
820 4,878,411

CLASS 84

314 N 4,878,413
421 4,878,414
726 4,878,412

CLASS 89

1.810 4,878,416
34 4,878,415

CLASS 91

363 R 4,878,417
421 4,878,418

CLASS 92

163 4,878,419

CLASS 98

2.08 4,878,420
42.07 4,878,421

CLASS 99

323.4 4,878,422
332 4,878,423
349 4,878,424
450.2 4,878,425
485 4,878,426

CLASS 101

219 4,878,427
484 4,878,428
486 4,878,429

CLASS 102

202.9 4,878,430
290 4,878,431
309 4,878,432
384 4,878,433
514 4,878,434

CLASS 104

9 4,878,435

CLASS 105

72.2 4,878,436
451 4,878,437

CLASS 106

27 4,878,946
75 4,878,947
90 4,878,948
100 4,878,949
273.1 4,878,950

CLASS 108

44 4,878,438
83 4,878,439

CLASS 110

233 4,878,440
238 4,878,441
345 4,878,442

CLASS 111

141 4,878,443

CLASS 112

264.1 4,878,444
311 4,878,445

CLASS 114

27 4,878,446
61 4,878,447
98 4,878,448
253 4,878,449
259 4,878,450
270 4,878,451
293 4,878,452

CLASS 116

288 4,878,453

CLASS 118

663 4,878,454

CLASS 119

57.5 4,878,455
156 4,878,456

CLASS 122

4 A 4,878,458
441 4,878,457
494 4,878,459

CLASS 123

52 MV 4,878,460
90.11 4,878,464
90.15 4,878,461
90.17 4,878,462
90.41 4,878,463
179 BG 4,878,465
193 CP 4,878,466
195 A 4,878,469
195 C 4,878,467
195 P 4,878,468
401 4,878,470
446 4,878,471
489 4,878,472
4,878,473
516 4,878,474
525 4,878,475

CLASS 126

9 R 4,878,476
41 R 4,878,477
61 4,878,478
84 4,878,479
91 A 4,878,480
307 R 4,878,481
375 4,878,482
523 4,878,483

CLASS 128

4 4,878,484
6 4,878,485
4,878,489
20 4,878,487
24 A 4,878,488
77 4,878,490
80 H 4,878,504
110 4,878,486
201.11 4,878,491
303.1 4,878,492
303.14 4,878,493
334 R 4,878,494
344 4,878,495
360 4,878,496
419 PG 4,878,497
419 S 4,878,498
653 A 4,878,499
660.01 4,878,500
715 4,878,501
725 4,878,502
882 4,878,505

CLASS 131

84.4 4,878,506
336 4,878,507

CLASS 132

320 4,878,508

CLASS 134

22.17 4,878,951

CLASS 135

20 M 4,878,509

CLASS 137

1 4,878,510
38 4,878,511
62 4,878,512
102 4,878,513
110 4,878,514
218 4,878,515
240 4,878,516
355.12 4,878,517
448 4,878,518

CLASS 138

31 4,878,519
149 4,878,520

CLASS 141

1.1 4,878,521
11 4,878,522
114 4,878,523

CLASS 144

356 4,878,524

CLASS 148

1 4,878,952
4 4,878,953
11.5 F 4,878,954
12 E 4,878,955
33.3 4,878,956
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103 4,878,958
111 4,878,959
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128 4,878,961
136 4,878,962
262 4,878,963
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404 4,878,965
421 4,878,966
437 4,878,967

CLASS 149

45 4,878,968

CLASS 152

14 4,878,525
209 R 4,878,526
379.3 4,878,527

CLASS 156

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70 4,878,971
78 4,878,972
85 4,878,973
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163 4,878,975
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272.4 4,878,978
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600 4,878,988
613 4,878,989
630 4,878,990
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633 4,878,992
643 4,878,993
4,878,994
4,878,995
653 4,878,996
659.1 Re.33,108

CLASS 160

168.1 4,878,528
201 4,878,529
211 4,878,530
327 4,878,531
332 4,878,532

CLASS 162

23 4,878,997
49 4,878,998
164.6 4,878,999
198 4,879,000
206 4,879,001
273 4,879,002
344 4,879,003

CLASS 164

16 4,878,533
154 4,878,534

CLASS 165

114 4,878,535
119 4,878,536
156 4,878,537

CLASS 166

264 4,878,538
303 4,878,539
369 4,878,540

CLASS 168

4 4,878,541

CLASS 172

1 4,878,542
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40 4,878,544
776 4,878,545

CLASS 173

163 4,878,546

CLASS 174

32 4,879,433
35 R 4,879,434
48 4,879,435
92 4,879,436

CLASS 175

53 4,878,547
248 4,878,549
296 4,878,550
340 4,878,548

CLASS 177

139 4,878,551
212 4,878,552

CLASS 178

18 4,878,553

CLASS 180

19.3 4,878,554
68.3 4,878,555
140 4,878,556

4,878,557
219 4,878,558
244 4,878,559

CLASS 181

130 4,878,560
188 4,878,561

CLASS 187

127 4,878,562

CLASS 188

71.5 4,878,563
73.31 4,878,564
378 4,878,565

CLASS 192

13 R 4,878,566
18 B 4,878,568
18 R 4,878,567
45 4,878,569
4,878,570
48.91 4,878,571
98 4,878,572

CLASS 194

338 4,878,573

CLASS 198

369 4,878,574
391 4,878,575
494 4,878,576
803.9 4,878,577
809 4,878,578

CLASS 200

1 R 4,879,437
61.85 4,879,438
81.9 M 4,879,439
82 R 4,879,440
144 B 4,879,441
293.1 4,879,443

CLASS 203

89 4,879,004

CLASS 204

1 T 4,879,005
1.5 4,879,006
15 4,879,007
56.1 4,879,018
72 4,879,008
98 4,879,009
105 R 4,879,010
157.15 4,879,012
157.42 4,879,011
180.2 4,879,013
190 4,879,014
224 R 4,879,015
242 4,879,016
298 4,879,017

CLASS 206

0.84 4,878,579
216 4,878,580
233 4,879,442
416 4,878,581

CLASS 208

111 4,879,019
130 4,879,020
413 4,879,021

CLASS 209

166 4,879,022
241 4,879,023
352 4,879,024
559 4,879,025
580 4,878,582

CLASS 210

123 4,879,026
4,879,027
169 4,879,028
198.2 4,879,029
238 4,879,030
321.61 4,879,032
360.2 4,879,031
396 4,879,033
400 4,879,034
416.4 4,879,035
500.38 4,879,036
634 4,879,037
635 4,879,038
4,879,039
637 4,879,040
640 4,879,041
642 4,879,042
651 4,879,043
654 4,879,044
695 4,879,045
747 4,879,046
756 4,879,047
768 4,879,048
777 4,879,049

CLASS 211

41 4,878,583
59.1 4,878,584
87 4,878,585
106 4,878,586

CLASS 212

271 4,878,587

CLASS 215

11.2 4,878,588
252 4,878,589

CLASS 219

10.55 A 4,879,444
64 4,879,445
75 4,879,446
86.25 4,879,447
121.6 4,879,449
121.63 4,879,448
121.64 4,879,450
121.69 4,879,451
130.4 4,879,452
213 4,879,453
494 4,879,454

CLASS 220

1 T 4,878,590
22 4,878,591
23.83 4,878,592
67 4,878,593
254 4,878,594
306 4,878,595
331 4,878,596
404 4,878,597

CLASS 222

1 4,878,598
4,878,599
105 4,878,600
137 4,878,601
161 4,878,602
167 4,878,603
209 4,878,604

CLASS 224

42.41 4,878,605
208 4,878,606

CLASS 226

24 4,878,607

CLASS 227

120 4,878,608

CLASS 228

4.5 4,878,609
6.2 4,878,610
180.2 4,878,611

CLASS 229

40 4,878,612
75 4,878,613

CLASS 235

280 4,879,455
385 4,879,540
462 4,879,456
487 4,879,457

CLASS 239

10 4,878,614
45 4,878,615
167 4,878,616
265.35 4,878,617
265.39 4,878,618
318 4,878,619
383 4,878,620
458 4,878,621
690.1 4,878,622

CLASS 241

5 4,878,623
29 4,878,624
37 4,878,625
57 4,878,626
199.12 4,878,627

CLASS 242

7.08 4,878,628
18 PW 4,878,629
43 R 4,878,630
55.2 4,878,631
199 4,878,632
268 4,878,633

CLASS 244

115 4,878,634
137.1 4,878,635
155 A 4,878,636
159 4,878,637

CLASS 246

34 CT 4,878,638

CLASS 248

73 4,878,639
297.2 4,878,640
309.1 4,878,641
311.2 4,878,642
475.1 4,878,643
674 4,878,644
680 4,878,645

CLASS 250

205 4,879,459
221 4,879,461
230 R 4,879,460
237 G 4,879,462
270 4,879,463
288 4,879,458
4,879,467
359.1 4,879,471
361 R 4,879,464
363.02 4,879,465
370.14 4,879,466
374 4,879,468
4,879,469
379 4,879,472
492.2 4,879,473
578 4,879,470

CLASS 251

9 4,878,646
30.05 4,878,647
63 4,878,648
121 4,878,649
129.15 4,878,650
172 4,878,651
181 4,878,652

CLASS 252

2 4,879,050
8.75 4,879,051
25 4,879,053
32.5 4,879,052
41 4,879,054
62.54 4,879,055
74 4,879,056
99 4,879,057
174.25 4,879,058
299.4 4,879,059
299.61 4,879,060
299.62 4,879,061
315.1 4,879,062
370 4,879,063
500 4,879,064
600 4,879,065
606 4,879,066
609 4,879,067

CLASS 254

134.3 FT 4,878,653

CLASS 260

397 4,879,068
397.2 4,879,069

CLASS 261

26 4,879,075

CLASS 264

1.4 4,879,072
22 4,879,073
24 4,879,074
28 4,879,076
40.1 4,879,077
41 4,879,078
56 4,879,079
63 4,879,080
101 4,879,081
106 4,879,082
122 4,879,083
295 4,879,084
564 4,879,085

CLASS 266

159 4,878,654
184 4,878,655

CLASS 270

53 4,878,656

CLASS 271

9 4,878,657
183 4,878,658
218 4,878,659
293 4,878,660

CLASS 272

52 4,878,661
118 4,878,662
134 4,878,663

CLASS 273

11 R 4,878,664
34 R 4,878,665
79 4,878,666
81.2 4,878,667
128 R 4,878,668
148 R 4,878,669
158 4,878,670
176 R 4,878,671
186 A 4,878,672
186 C 4,878,673
213 4,878,674
251 4,878,675

CLASS 277

24 4,878,676
105 4,878,677
235 A 4,878,678

CLASS 279

19.4 4,878,679

CLASS 280

30 4,878,680
32.7 4,878,681
42 4,878,682
96.1 4,878,683
189 4,878,691
288.1 4,878,684
304.1 4,878,685
602 4,878,686
605 4,878,687
693 4,878,688
731 4,878,689
741 4,878,690
804 4,878,692

CLASS 281

45 4,878,693

CLASS 285

24 4,878,694
39 4,878,695
61 4,878,696
250 4,878,697
342 4,878,698

CLASS 292

143 4,878,699
241 4,878,700
288 4,878,701
307 4,878,702

CLASS 294

1.5 4,878,703
54.5 4,878,704
116 4,878,705

CLASS 296

37.1 4,878,706
91 4,878,707
97.7 4,878,708

CLASS 297

68 4,878,709
4,878,710

CLASS 299

9 4,878,711
10 4,878,712
39 4,878,713
67 4,878,714

CLASS 303

110 4,878,715

CLASS 305

21 4,878,716

CLASS 307

10.1 4,879,476
68 4,879,475
116 4,879,474
239 4,879,477
353 4,879,478
425 4,879,479
446 4,879,480
465 4,879,481

CLASS 310

12 4,879,482
63 4,879,483
114 4,879,484
156 4,879,485
254 4,879,486
313 A 4,879,487

CLASS 313

15 4,879,489
318 4,879,491
487 4,879,492
601 4,879,490
641 4,879,493

CLASS 315

61 4,879,494
362 4,879,495
366 4,879,496

CLASS 318

254 4,879,497
4,879,498
568.16 4,879,499
632 4,879,500
645 4,879,501
723 4,879,502
809 4,879,503

CLASS 323

272 4,879,504
312 4,879,505
314 4,879,506

CLASS 324

57 N 4,879,507
61 R 4,879,508
108 4,879,509
150 4,879,510
163 4,879,511
207 4,879,512
4,879,513
309 4,879,514
318 4,879,515
4,879,516
438 4,879,517

CLASS 328

233 4,879,518

CLASS 330

4.3 4,879,532
149 4,879,519
257 4,879,520
258 4,879,521
263 4,879,522
288 4,879,523
4,879,524
294 4,879,525
295 4,879,526

CLASS 331

1 A 4,879,527
4 4,879,528
14 4,879,529
45 4,879,530
65 4,879,531

CLASS 333

206 4,879,533
257 4,879,534

CLASS 335

14 4,879,535
128 4,879,536
216 4,879,537
298 4,879,538
299 4,879,539

CLASS 340

326 4,879,542
473 4,879,543
552 4,879,544
624 4,879,545
632 4,879,546
686 4,879,547
712 4,879,548
815.2 4,879,549
825.050 4,879,550
825.070 4,879,541
825.870 4,879,551
870.37 4,879,552
932.2 4,879,553
4,879,554

CLASS 341

13 4,879,555
20 4,879,556
23 4,879,557
51 4,879,558
171 4,879,488

CLASS 342

25 4,879,559
165 4,879,560
195 4,879,561

CLASS 343

700 MS 4,879,562
713 4,879,570
725 4,879,563

CLASS 346

25 4,879,564
75 4,879,565
76 PH 4,879,566
139 R 4,879,567
140 R 4,879,568
159 4,879,569

CLASS 350

3.66 4,878,717
3.69 4,878,718
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339 F 4,878,741
347 V 4,878,742
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CLASS 351

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CLASS 354

410 4,878,751

CLASS 355

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214 4,879,576
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235 4,879,579
295 4,879,580

CLASS 356

152 4,878,752
237 4,878,753
376 4,878,754
382 4,878,755
406 4,878,756
432 4,878,757

CLASS 357

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CLASS 358

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213.19 4,879,600
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233 4,879,602
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296 4,879,605
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474 4,879,604

CLASS 360

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99.06 4,879,616
106 4,879,617
4,879,618
113 4,879,619
123 4,879,620
133 4,879,621

CLASS 361

19 4,879,622
33 4,879,623
65 4,879,624
90 4,879,625
93 4,879,626
283 4,879,627
327 4,879,628
385 4,879,629
386 4,879,630
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388 4,879,634
391 4,879,635

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61 4,879,636
141 4,879,637
294 4,879,638

CLASS 363

37 4,879,639

41 4,879,640
98 4,879,641

CLASS 364

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148 4,879,643
167.01 4,879,644
200 4,879,645
4,879,646
4,879,647
300 4,879,648
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411 4,879,651
413.18 4,879,652
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474.15 4,879,660
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519 4,879,666
522 4,879,667
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559 4,879,670
562 4,879,671
566 4,879,672
571.01 4,879,673
724.03 4,879,674
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101 4,878,758
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140 4,879,698

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282 4,879,702

CLASS 369

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14 4,879,704
32 4,879,705
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4,879,708
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291 4,879,710

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60 4,879,712
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238 4,878,845

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311 4,879,431

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195 4,879,257
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4,879,762
605 4,879,760
607 4,879,763
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144 4,878,882

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204 4,878,886
245 4,878,887

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204 4,878,888

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114	4,879,329	440	4,879,356	55.1	4,879,375	11	4,879,397	412	4,879,415	24	4,878,894
151	4,879,330	462	4,879,357		CLASS 540	413	4,879,398		CLASS 568	49	4,878,895
267	4,879,331	474	4,879,334	3	4,879,379	439	4,879,378	13	4,879,416	65	4,878,896
430	4,879,120	539	4,879,358	137	4,879,380		CLASS 558	387	4,879,417	86	4,878,897
436	4,879,332		CLASS 526	222	4,879,381	34	4,879,399	454	4,879,418	101	4,878,898
460	4,879,333	105	4,879,359	554	4,879,382	83	4,879,400	606	4,879,419	110	4,878,899
495	4,879,335	201	4,879,361		CLASS 544	488	4,879,401	617	4,879,420	119	4,878,900
503	4,879,336	247	4,879,362	37	4,879,383		CLASS 560	737	4,879,421	174	4,878,901
504	4,879,337	314	4,879,363	343	4,879,386	26	4,879,402	835	4,879,422	192	4,878,902
508	4,879,338	318.2	4,879,364		CLASS 546	38	4,879,403		CLASS 570	199	4,878,903
740	4,879,339		CLASS 528	114	4,879,384	54	Re.33,109	127	4,879,423	273	4,878,904
	CLASS 525	49	4,879,365		CLASS 548	051	4,879,404		CLASS 585	385.2	Re.33,106
54.2	4,879,340	125	4,879,366	262	4,879,388	211	4,879,405	322	4,879,424	891.1	4,878,905
66	4,879,341	371	4,879,367	412	4,879,389	227	4,879,406	350	4,879,425		CLASS 623
67	4,879,342	397	4,879,368	453	4,879,390	330	4,879,407	469	4,879,426	1	4,878,906
71	4,879,343		CLASS 530	486	4,879,391		4,879,408	500	4,879,427		4,878,907
100	4,879,344	205	4,879,369	492	4,879,392	344	4,879,409	533	4,879,428	2	4,878,908
104	4,879,345	331	4,879,370	544	4,879,393		4,879,410	670	4,879,429	6	4,878,909
146	4,879,346	334	4,879,371		CLASS 549		CLASS 562		CLASS 600		4,878,910
263	4,879,347		CLASS 534	248	4,879,387	401	4,879,411				4,878,911
305	4,879,348	618	4,879,372	255	4,879,394	550	4,879,070	31	4,878,889		4,878,912
329.3	4,879,352	864	4,879,373	408	4,879,395	600	4,879,412	37	4,878,890	12	4,878,913
332.1	4,879,350		CLASS 536	534	4,879,396	882	4,879,071		CLASS 604	16	4,878,914
	4,879,351	18.1	4,879,376				CLASS 564	5	4,878,891	17	4,878,915
332.8	4,879,349	18.2	4,879,377			63	4,879,413	20	4,878,892	18	4,878,916
357	4,879,353										4,878,917
396	4,879,360									22	4,878,918
425	4,879,354									23	4,878,919

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	370	H699	149—	109.6	H705	244—	221	H703	355—	67	H711		900	H714	536—	18.5	H708

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D2—	276	304,386		309	304,408	D11—	6	304,430		170	304,453			304,473		36	304,495
	314	304,387			304,409		25	304,431		231	304,454		148	304,474		54	304,496
		304,388			304,410			304,432		258	304,443		160	304,475	D25—	47	304,497
		304,389		351	304,411		78	304,433	D15—	126	304,455		161	304,476		58	304,498
	320	304,390			304,412	D12—	146	304,434		132	304,456		171	304,477		62	304,499
D3—	71	304,391		397	304,413			304,435	D18—	13	304,457			304,478		114	304,500
D4—	135	304,392	D8—	18	304,414		156	304,436		24	304,458			304,479			304,501
D6—	334	304,393			304,415		190	304,437	D19—	2	304,459			304,480	D26—	3	304,502
	361	304,394		49	304,416		345	304,438		77	304,460		177	304,481		7	304,503
	405	304,395		50	304,417	D13—	8	304,439		86	304,461			304,482		28	304,504
	451	304,396		57	304,418		10	304,440		90	304,462		189	304,484		76	304,507
	454	304,397		61	304,419		24	304,441	D21—	12	304,463		220	304,485	D27—	105	304,508
	479	304,398		98	304,420		32	304,442		59	304,464	D23—	233	304,486	D28—	84	304,509
	498	304,399		373	304,421	D14—	105	304,444			304,465		245	304,487	D30—	106	304,506
	502	304,400	D9—	347	304,422		113	304,445		61	304,466			304,488	D32—	1	304,505
	514	304,401		376	304,423		114	304,446		91	304,467			304,489		15	304,510
	523	304,402		453	304,424			304,447			304,468			304,490		18	304,511
D7—	43	304,403	D10—	12	304,425			304,448		105	304,483		255	304,491		35	304,512
	50	304,404		77	304,426			304,449		108	304,469		386	304,492		40	304,513
	70	304,405		83	304,427		115	304,451			304,470	D24—	8	304,493	D99—	25	304,514
	152	304,406		92	304,428		118	304,450		141	304,471						

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PATENTS

01 : 4,878,803	4,878,782	4,879,583	4,879,627	4,879,722	4,879,425
4,878,895	4,878,801	4,879,587	4,879,648	4,879,723	4,879,465
02 : 4,878,380	4,878,805	4,879,589	10 : 4,878,280	4,879,758	4,879,484
04 : 4,878,270	4,878,845	4,879,603	4,878,930	13 : 4,878,307	4,879,533
4,878,285	4,878,856	4,879,610	4,878,937	4,878,436	4,879,568
4,878,371	4,878,868	4,879,612	4,878,968	4,878,490	4,879,623
4,878,456	4,878,878	4,879,617	4,879,043	4,878,693	4,879,624
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06 : 4,878,275	4,879,020	4,879,720	12 : 4,878,259	4,879,558	4,879,241
4,878,290	4,879,027	4,879,721	4,878,260	15 : 4,878,515	4,879,353
4,878,294	4,879,040	4,879,727	4,878,283	4,878,520	19 : 4,878,262
4,878,297	4,879,042	4,879,731	4,878,303	16 : 4,878,335	4,878,538
4,878,304	4,879,073	4,879,745	4,878,310	4,878,397	4,878,559
4,878,305	4,879,079	4,879,746	4,878,314	4,878,478	4,878,670
4,878,316	4,879,080	08 : 4,878,485	4,878,323	4,878,652	4,878,736
4,878,322	4,879,111	4,878,614	4,878,348	4,878,779	4,878,944
4,878,333	4,879,127	4,878,653	4,878,366	4,879,126	4,879,294
4,878,334	4,879,140	4,878,712	4,878,415	4,879,631	4,879,304
4,878,376	4,879,150	4,878,756	4,878,427	17 : 4,878,298	4,879,426
4,878,408	4,879,213	4,878,902	4,878,450	4,878,329	20 : 4,878,540
4,878,419	4,879,215	4,879,161	4,878,497	4,878,393	4,878,584
4,878,429	4,879,226	4,879,547	4,878,617	4,878,424	4,878,644
4,878,457	4,879,237	4,879,577	4,878,618	4,878,445	4,879,289
4,878,491	4,879,257	4,879,707	4,878,661	4,878,458	21 : 4,878,368
4,878,525	4,879,259	4,879,708	4,878,673	4,878,475	4,878,459
4,878,560	4,879,262	09 : 4,878,337	4,878,705	4,878,498	4,878,508
4,878,585	4,879,265	4,878,383	4,878,778	4,878,510	4,878,625
4,878,588	4,879,267	4,878,421	4,878,786	4,878,511	4,879,318
4,878,591	4,879,268	4,878,463	4,878,794	4,878,589	22 : 4,878,341
4,878,598	4,879,275	4,878,568	4,878,800	4,878,613	4,878,576
4,878,602	4,879,282	4,878,579	4,878,810	4,878,672	4,878,612
4,878,635	4,879,338	4,878,636	4,878,811	4,878,792	4,878,643
4,878,642	4,879,366	4,878,733	4,878,851	4,878,809	4,878,663
4,878,645	4,879,446	4,878,747	4,878,903	4,878,823	4,878,762
4,878,646	4,879,451	4,878,790	4,878,931	4,878,849	4,878,830
4,878,678	4,879,468	4,878,871	4,878,965	4,878,874	4,879,121
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4,878,695	4,879,478	4,879,090	4,879,351	4,878,963	4,879,182
4,878,719	4,879,481	4,879,093	4,879,448	4,878,987	4,879,590
4,878,730	4,879,488	4,879,145	4,879,520	4,879,001	4,879,659
4,878,741	4,879,495	4,879,147	4,879,523	4,879,021	4,879,719
4,878,744	4,879,504	4,879,189	4,879,525	4,879,054	23 : 4,878,410
4,878,748	4,879,537	4,879,391	4,879,554	4,879,162	4,878,872
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DESIGN PATENTS

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04 : 304,446
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06 : 304,404
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